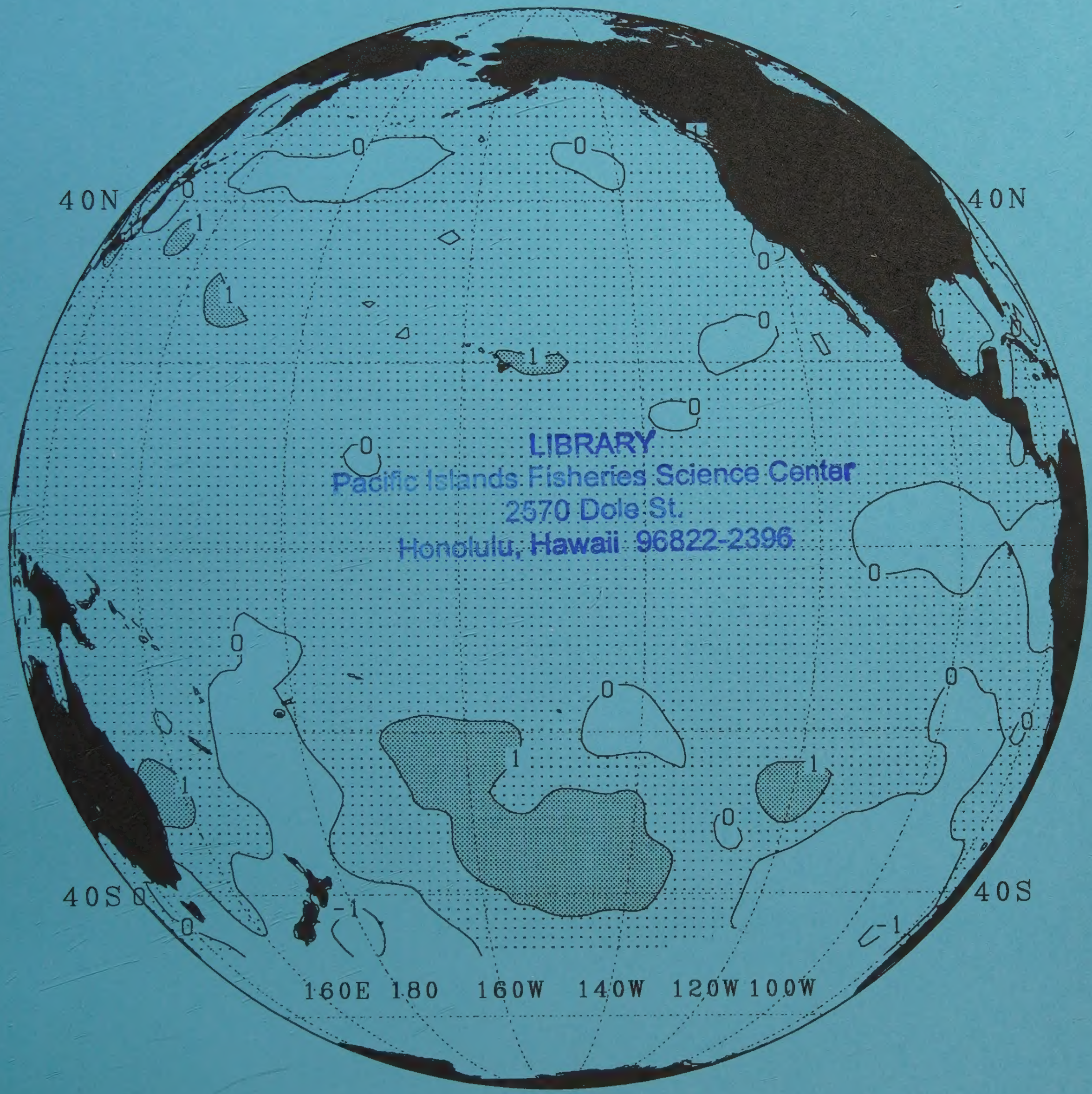
ISSN 1348-5059

気象庁海洋月報

Monthly Ocean Report
April 2004 (No. 136)



Climate and Marine Department
Japan Meteorological Agency

気象庁 気候・海洋気象部

平成16年4月

気象庁海洋月報は、気象庁 気候・海洋気象部 海洋気象情報室で作成しています。
本月報に関する問い合わせは、
〒100-8122　東京都千代田区大手町１-３-４　気象庁 気候・海洋気象部 海洋気象情報室まで。
電　話 (03) 3212-8341 (内線 5127、5166)
ＦＡＸ (03) 3211-3047
電子メール ocean@climar.kishou.go.jp

Monthly Ocean Report is prepared by the Office of Marine Prediction, Climate and Marine Department, Japan Meteorological Agency.

Correspondence relating to this report may be directed to :

Ippei Eguchi
Head, Office of Marine Prediction
Climate and Marine Department, Japan Meteorological Agency
1-3-4 Ote-machi, Chiyoda-ku, Tokyo 100-8122 Japan
Facsimile: +81-3-3211-3047
e-mail : ocean@climar.kishou.go.jp

表紙は、2004 年 4 月の太平洋の月平均海面水温偏差図です。
陰影部は、平年より高温の海域を示しています。

The figure on the front cover shows the monthly mean SST anomalies for April 2004 in the Pacific Ocean.
Areas of positive anomalies are shaded.

目　次

[1] MGDSST (Merged satellite and *in-situ* data Global Daily SST)を使用している。
[2] 従来と同様の、現場観測による海面水温をもとにした解析値を使用している。

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[1] Based on MGDSST (Merged satellite and *in-situ* data Global Daily SST).
[2] Based on the traditional analysis using *in-situ* SSTs.

海況の特徴（２００４年４月）

日本近海の海況

海面水温は、北海道の南東、日本海北部・西部、及び関東の南から南西諸島にかけての海域で平年より0.5℃以上高かった。一方、常磐沖では-1℃を超える負偏差がみられた。深さ100mで5℃以下の親潮系冷水の沿岸よりの分枝は、平年より大きく南下し、宮城県沖まで達していた（第４図、第６図）。

黒潮は、九州の東を離岸して北東に流れ、上旬は室戸岬から紀伊半島にかけて、中・下旬は紀伊半島に接岸して流れていた。これより東では、月を通じて東海沖を東に流れた後、三宅島の南を通過し、房総半島沖を北東に流れていた（第９図）。

太平洋の海況

太平洋赤道域の海面水温は、140° Eから175° Wにかけて+0.5℃を超える正偏差が見られた。一方、115° Wから100° Wと90° W以東では-0.5℃を超える負偏差が見られた。

北太平洋の海面水温は、おおむね平年より高く、35° N・155° E付近、25° N・165° E付近、及び20° N・150° W付近で+1℃を超える正偏差が見られた。一方、45° Nの日付変更線付近では平年より0.5℃以上低かった（第１７図）。

Highlights April 2004

Seas adjacent to Japan

SSTs were more than 0.5℃ above normal in the northern and western parts of the Japan Sea, southeast of Hokkaido and from south of Kanto to around the Nansei Islands. Negative SST anomalies exceeding -1℃ were found in the seas off Joban. The coastal branch of the Oyashio cold water, which was less than 5℃ at the depth of 100 meters, extended significantly southward up to off Miyagi prefecture (Fig. 4, Fig. 6).

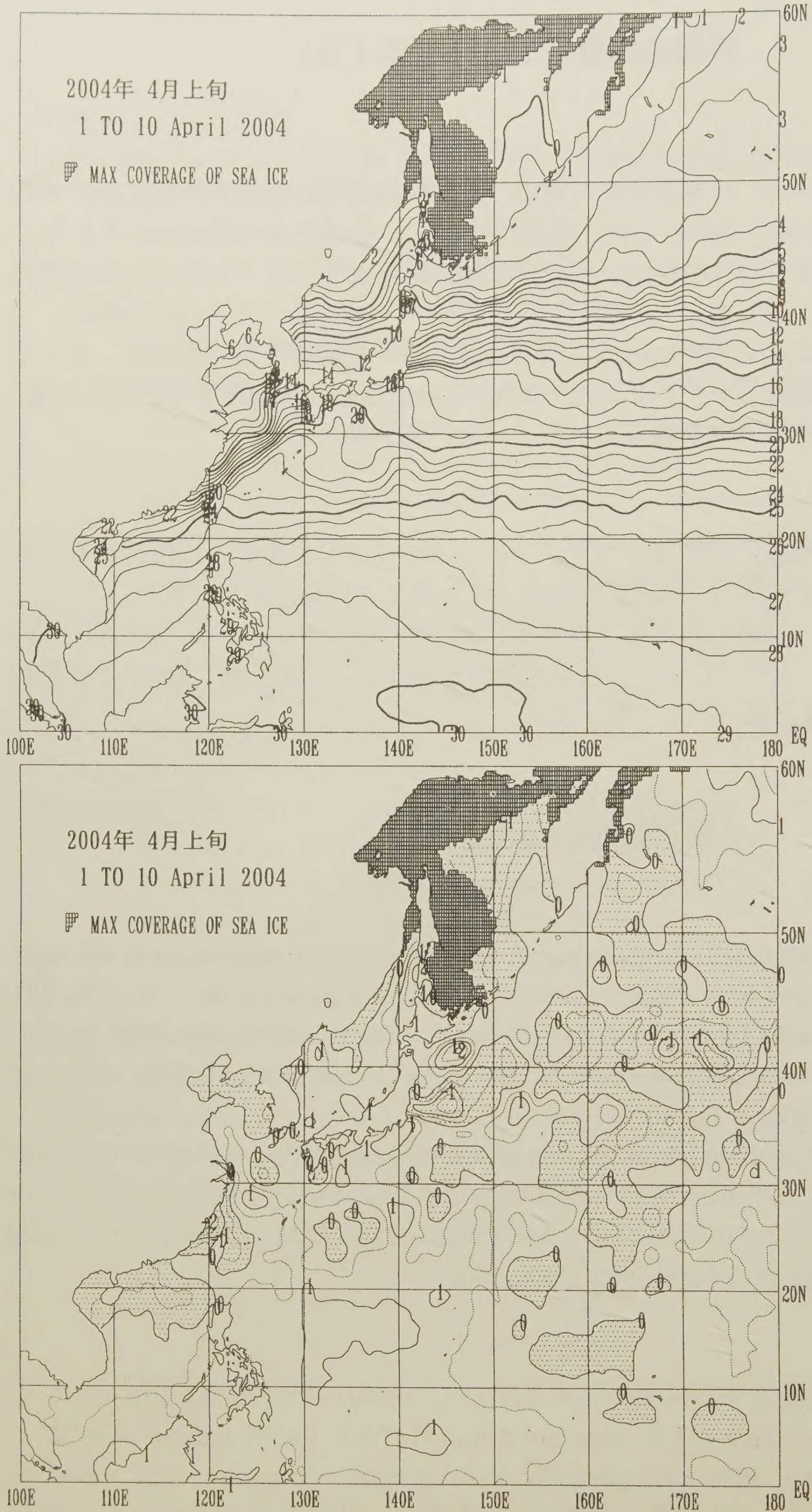
The Kuroshio flowed NE-ward off the east of Kyushu, then it flowed close to the coasts from Muroto Misaki to the Kii Peninsula in early April, and close to the Kii Peninsula during the rest of the month. After flowing eastward off Tokai, it passed south of Miyake Island and flowed NE-ward off the Boso Peninsula throughout the month (Fig. 9).

Pacific Ocean

In the equatorial Pacific, SSTs were more than 0.5℃ above normal from 140°E to 175°W. Negative SST anomalies exceeding -0.5℃ were found from 115°W to 100°W and east of 90°W.

In the North Pacific, SSTs were generally above normal, and positive SST anomalies exceeding +1℃ were found around 35°N, 155°E, around 25°N, 165°E and around 20°N, 150°W. SSTs were more than 0.5℃ below normal around the date line along 45°N (Fig. 17).

Ten-day mean SST & Anomalies



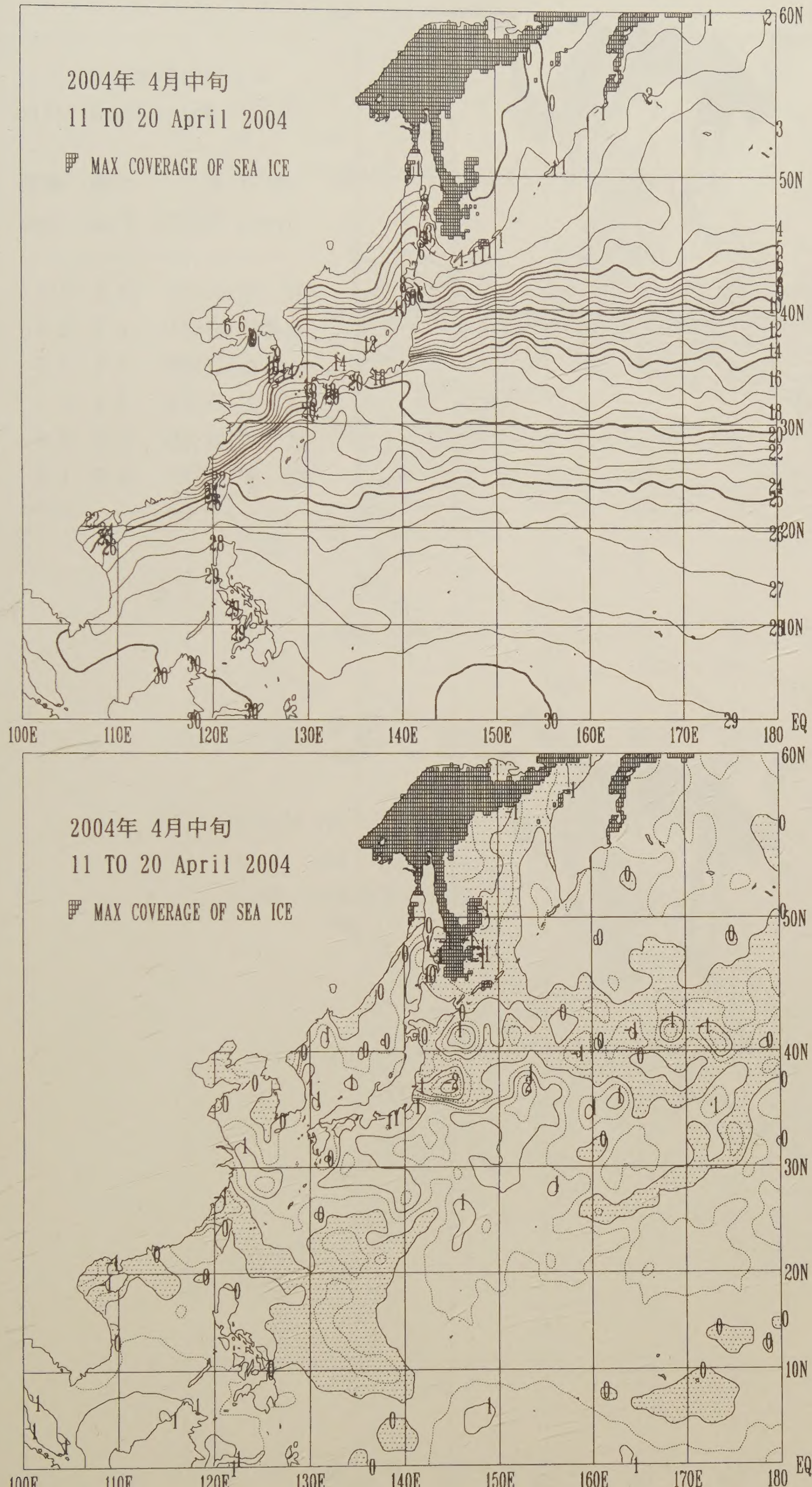
旬平均沿岸水温(℃)
Coastal Water Temperature

地点名 (Index Number)	水温 Temp.	偏差 Anom.
石　垣(47918)	22.8	-0.5
御前崎(47655)	15.1	0.8
小名浜(47598)	8.9	-0.8
宮　古(47585)	7.8	1.2
江　差(47428)	8.3	0.8
浜　田(47755)	14.5	0.9

第1図 北西太平洋旬平均海面水温図(上)及び偏差図(下) (2004年 4月上旬)

Fig. 1 Ten-day mean SST (top) and anomalies (bottom) in the western North Pacific for the 1st ten-day period in April 2004. Anomalies are computed from the JMA climatology (1971-2000). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown by broken lines. Negative anomalies are spotted.

Ten-day mean SST & Anomalies



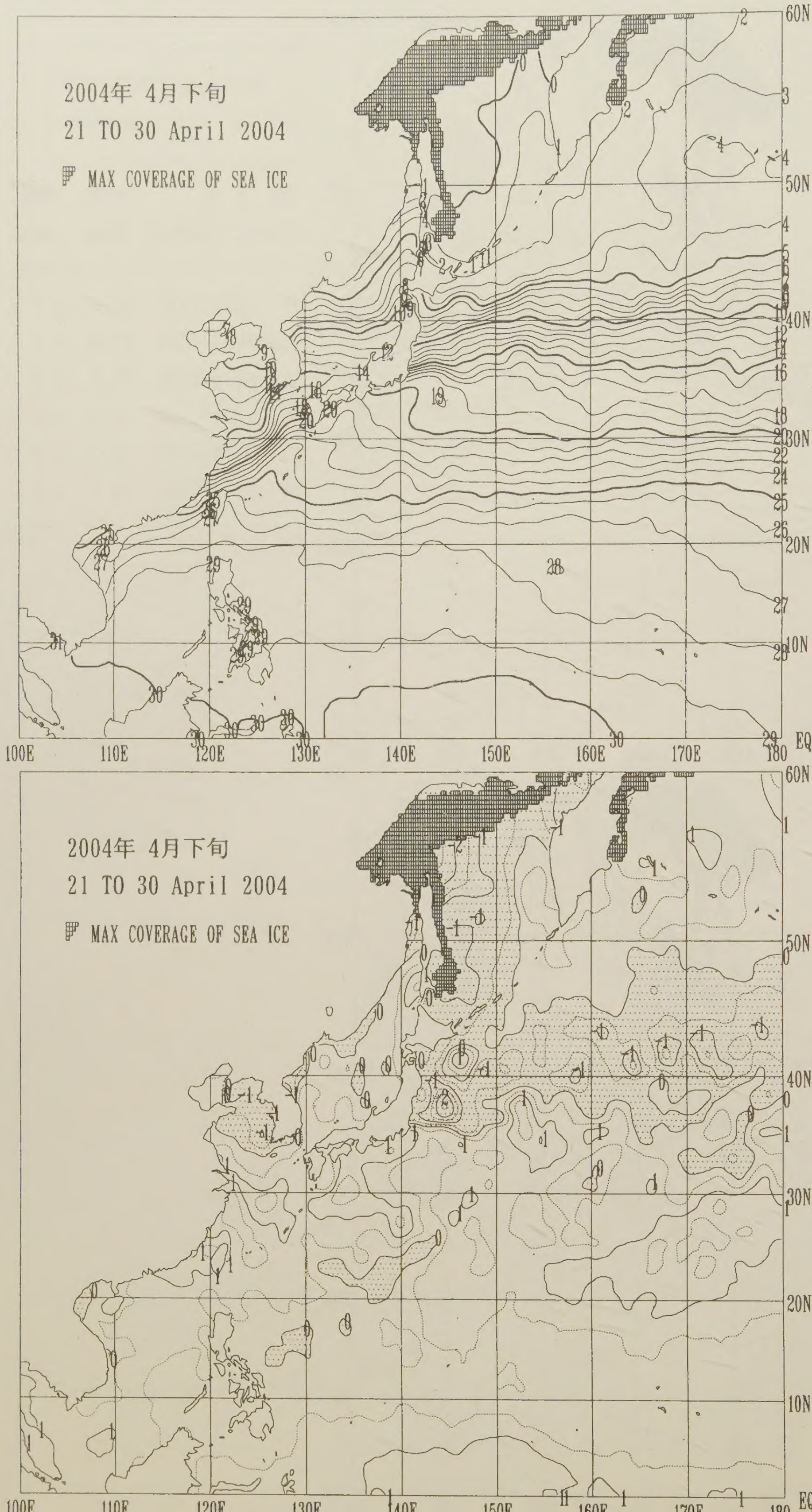
旬平均沿岸水温(℃)
Coastal Water Temperature

地点名 (Index Number)	水温 Temp.	偏差 Anom.
石　垣(47918)	24.0	-0.1
御前崎(47655)	17.0	1.5
小名浜(47598)	10.3	-0.5
宮　古(47585)	8.7	1.6
江　差(47428)	10.2	1.9
浜　田(47755)	16.1	1.8

第2図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(2004年 4月中旬)

Fig. 2 Ten-day mean SST (top) and anomalies (bottom) in the western North Pacific for the 2nd ten-day period in April 2004. Anomalies are computed from the JMA climatology (1971-2000). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown by broken lines. Negative anomalies are spotted.

Ten-day mean SST & Anomalies

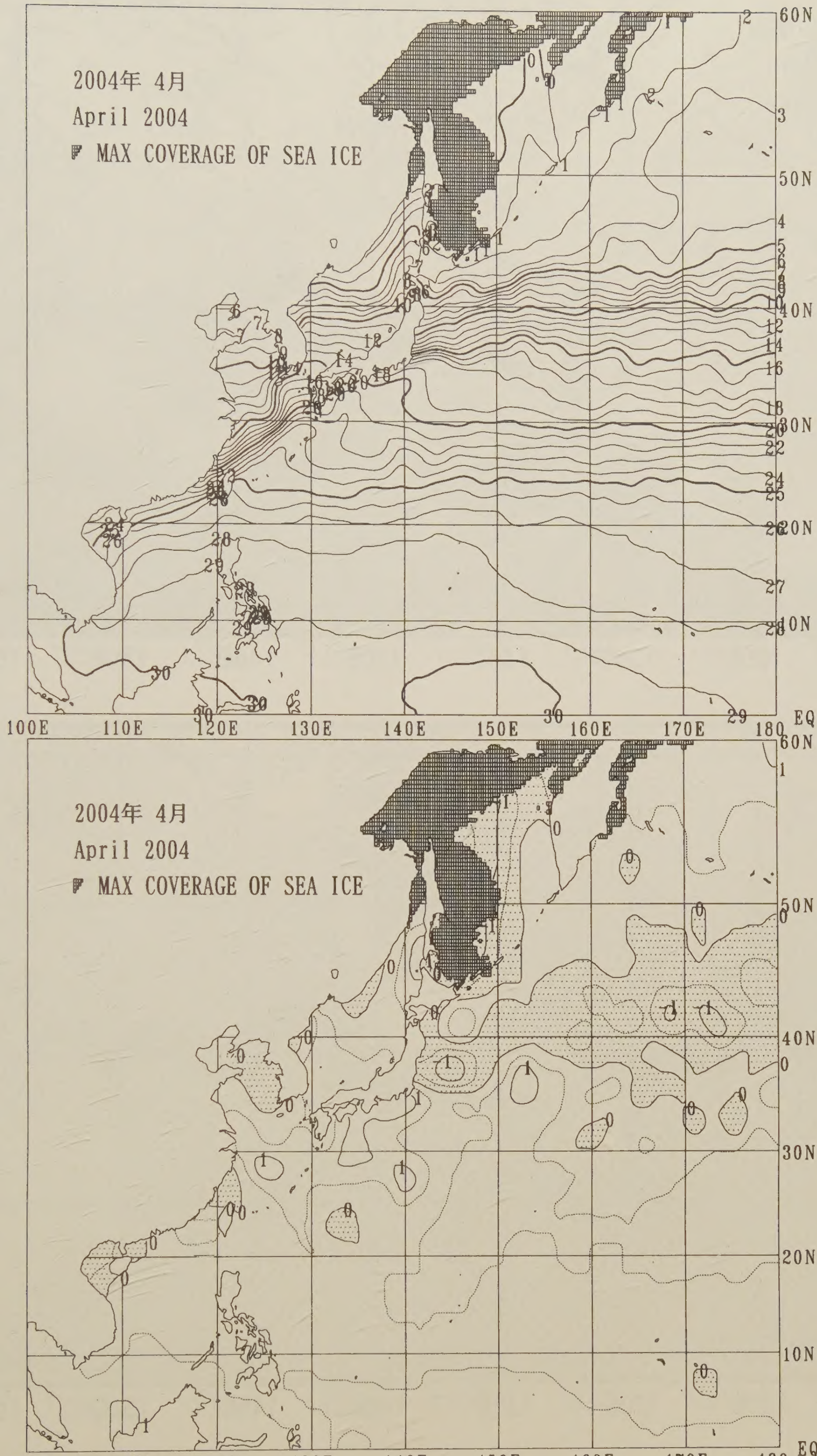


旬平均沿岸水温（℃）
Coastal Water Temperature

地点名 (Index Number)	水温 Temp.	偏差 Anom.
石　垣(47918)	24.2	-0.7
御前崎(47655)	16.8	0.4
小名浜(47598)	9.7	-1.9
宮　古(47585)	8.8	1.1
江　差(47428)	9.9	0.6
浜　田(47755)	16.8	1.3

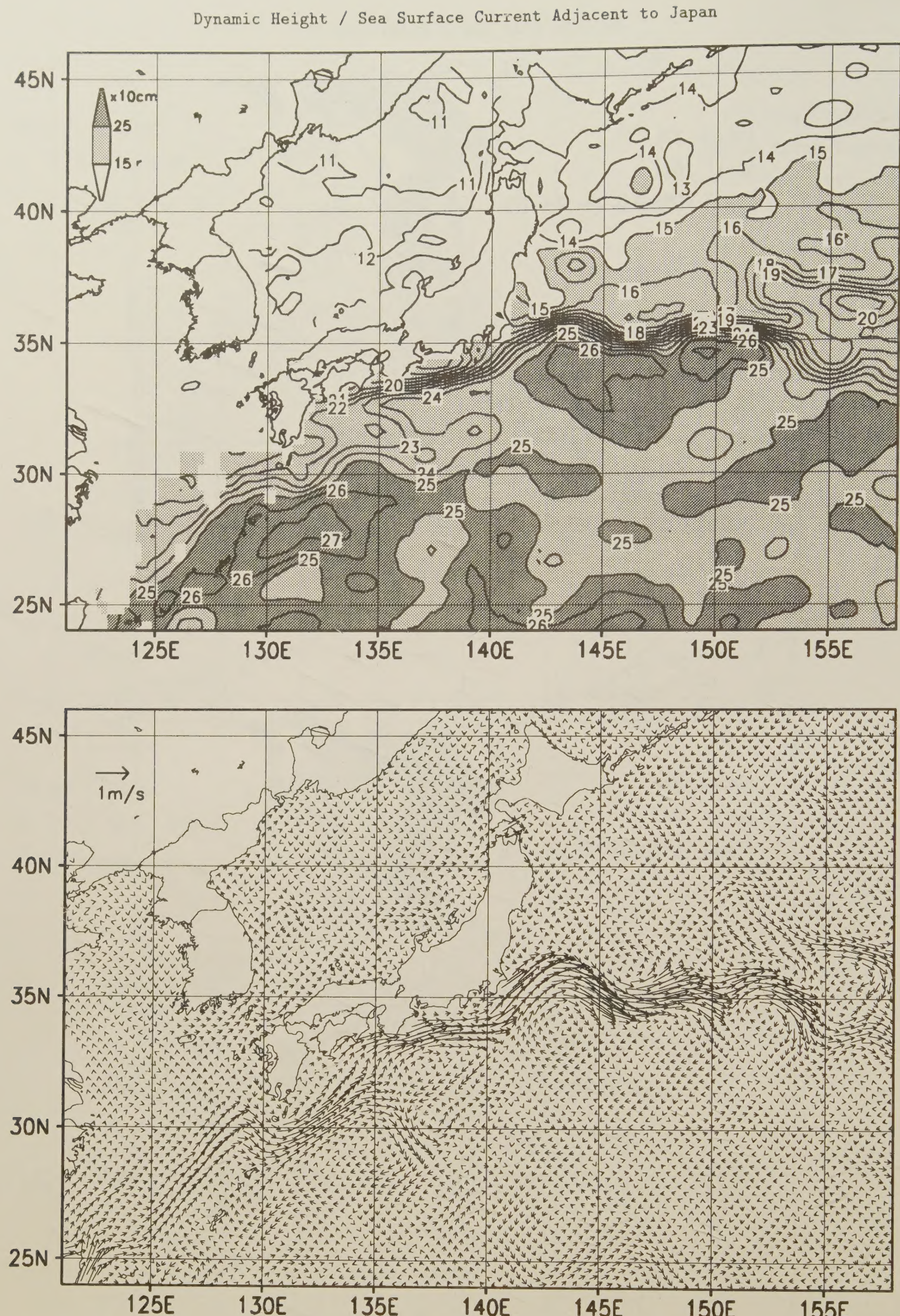
第3図 北西太平洋旬平均海面水温図（上）及び偏差図（下）（2004年 4月下旬）

Fig. 3 Ten-day mean SST (top) and anomalies (bottom) in the western North Pacific for the 3rd ten-day period in April 2004. Anomalies are computed from the JMA climatology (1971-2000). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown by broken lines. Negative anomalies are spotted.



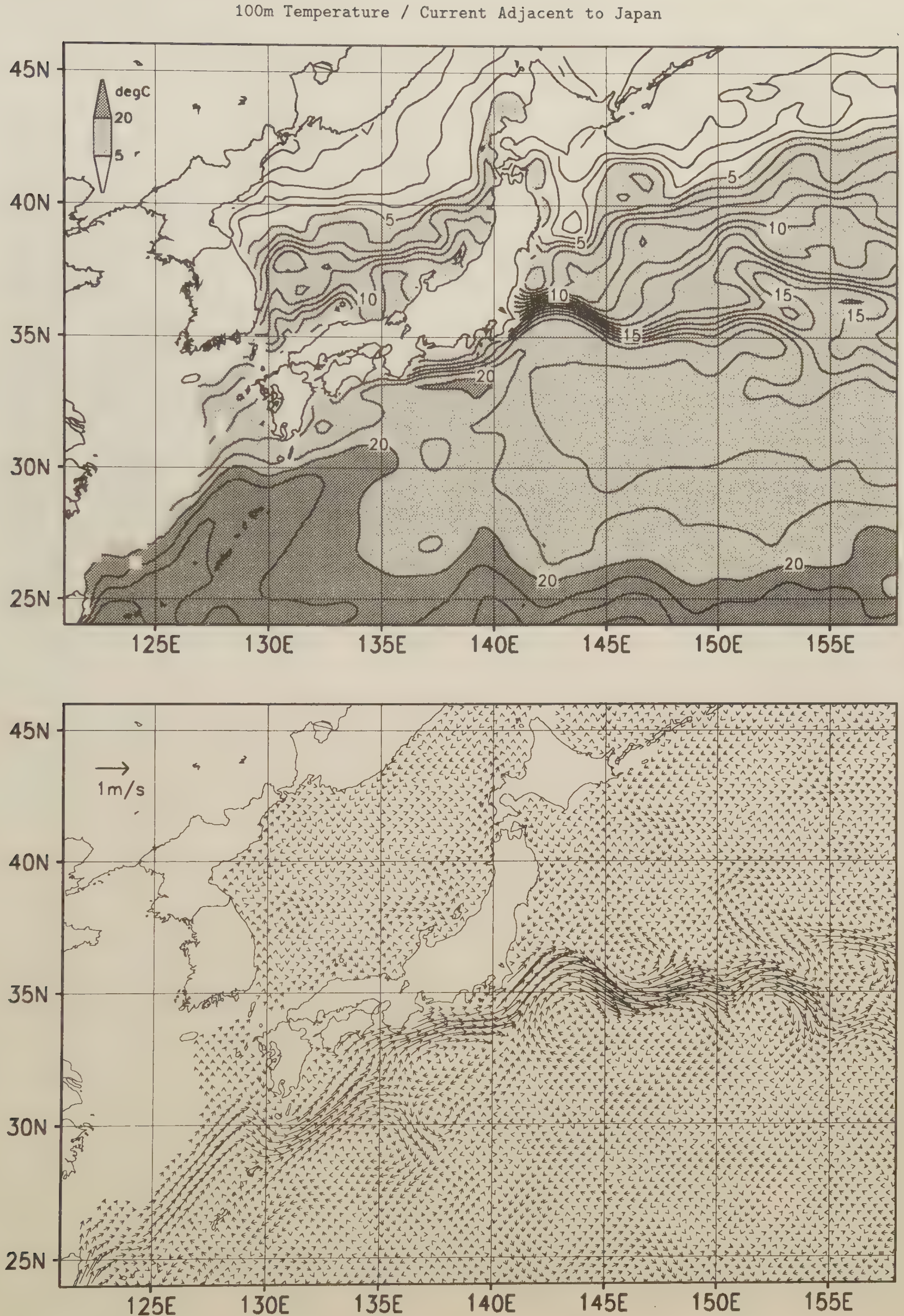
第4図 北西太平洋月平均海面水温図(上)及び偏差図(下) (2004年 4月)

Fig. 4 Monthly mean SST (top) and anomalies (bottom) in the western North Pacific for April 2004. Anomalies are computed from the JMA climatology (1971-2000). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown by broken lines. Negative anomalies are spotted.



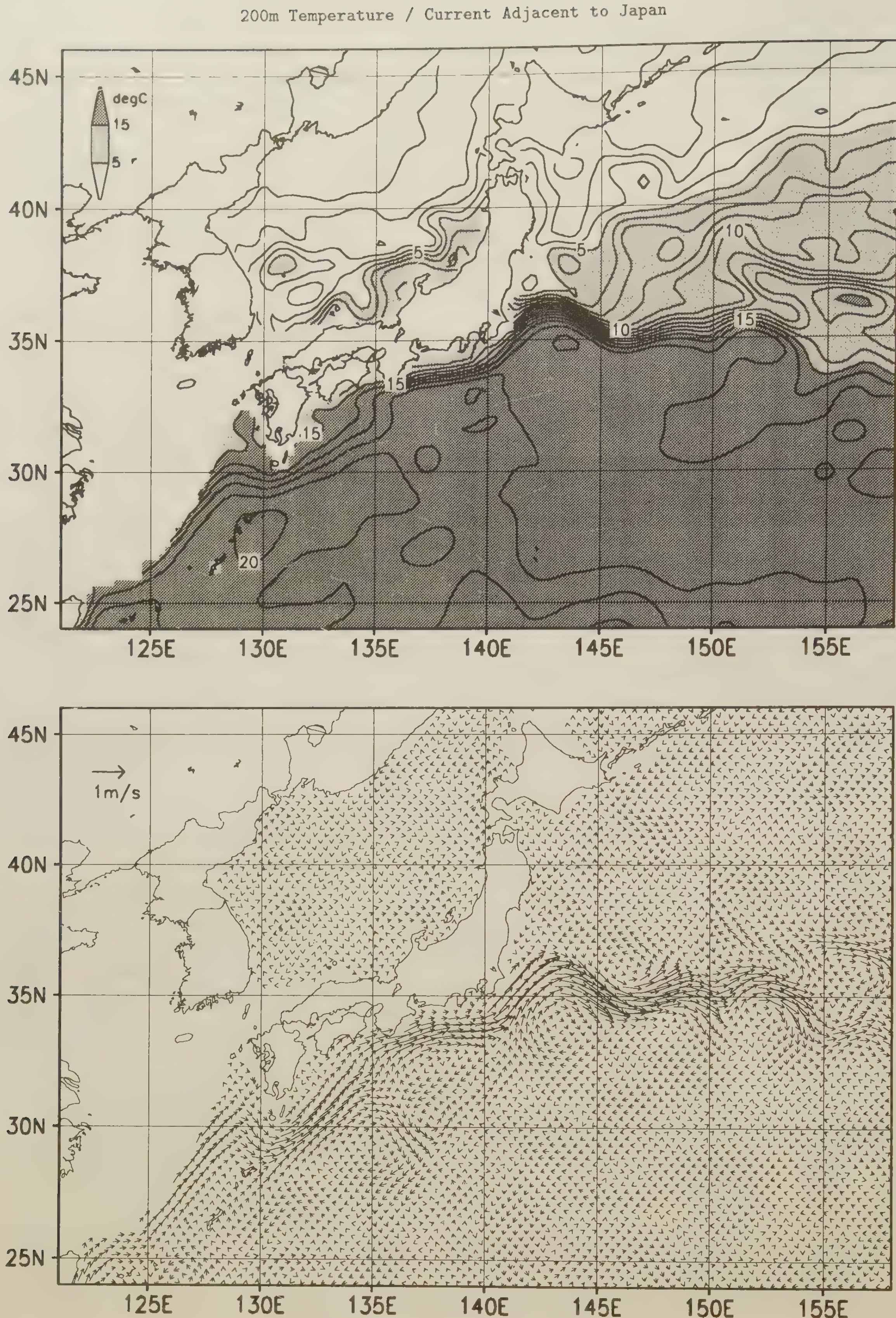
第5図　日本近海月平均海面高度分布図(上)と海面海流図(下)（2004年4月）
（海洋総合解析システムによる）

Fig. 5　Monthly mean sea surface height (top) and current (bottom) in seas adjacent to Japan for April 2004. Contour interval is 10cm (top). (calculated by the Ocean Comprehensive Analysis System)



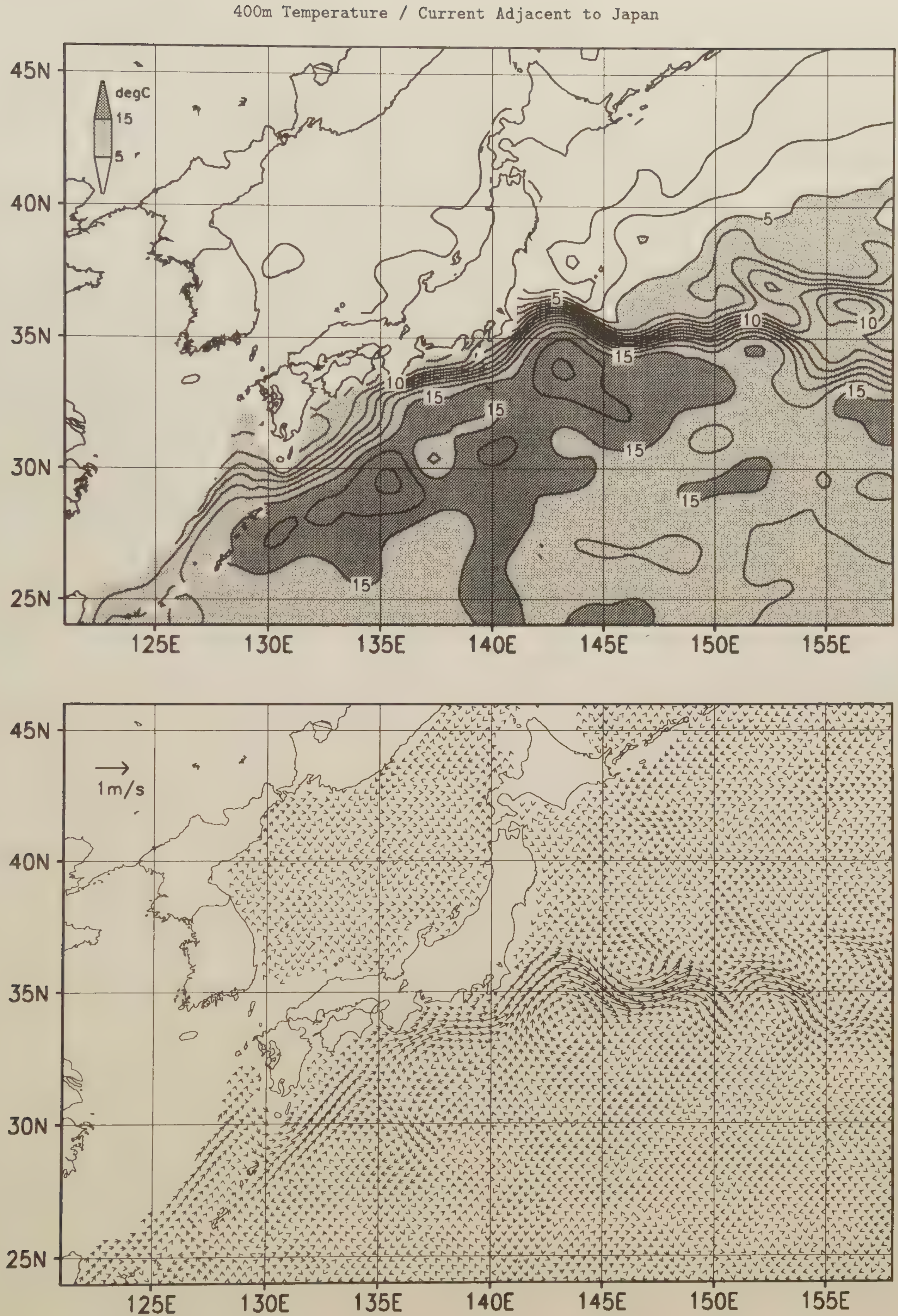
第 6 図　日本近海月平均表層水温図（上）と表層海流図（下）（深さ 100 m）（2004 年 4 月）
（海洋総合解析システムによる）

Fig. 6　Monthly mean subsurface (100 m) temperature (top) and current (bottom) in seas adjacent to Japan for April 2004. Contour interval is 1 ℃ (top). (calculated by the Ocean Comprehensive Analysis System)



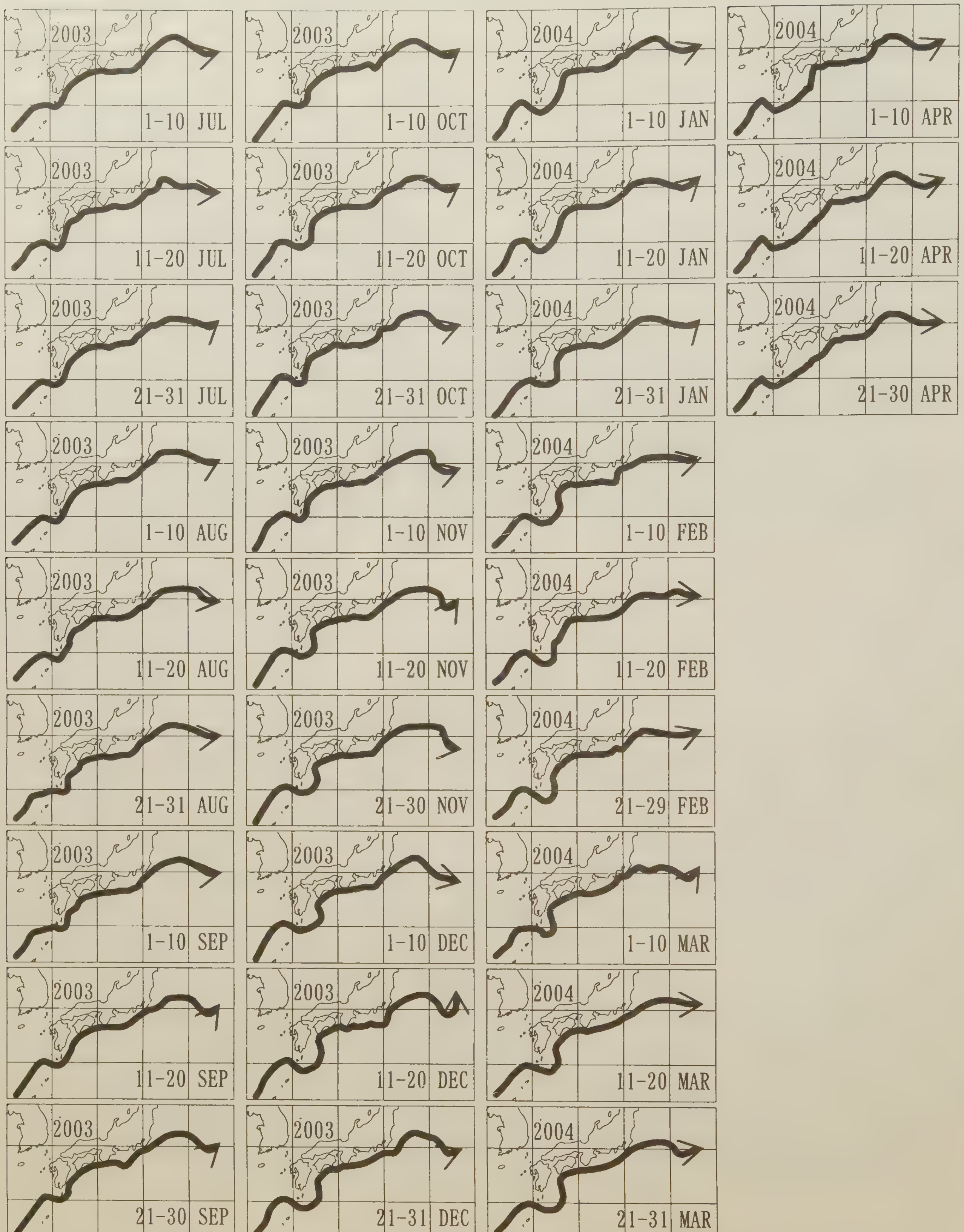
第 7 図　日本近海月平均表層水温図（上）と表層海流図（下）（深さ 200 m）（2004 年 4 月）
（海洋総合解析システムによる）

Fig. 7　Monthly mean subsurface (200 m) temperature (top) and current (bottom) in seas adjacent to Japan for April 2004. Contour interval is 1 ℃ (top). (calculated by the Ocean Comprehensive Analysis System)



第 8 図　日本近海月平均表層水温図（上）と表層海流図（下）（深さ 400 m）(2004 年 4 月)
（海洋総合解析システムによる）

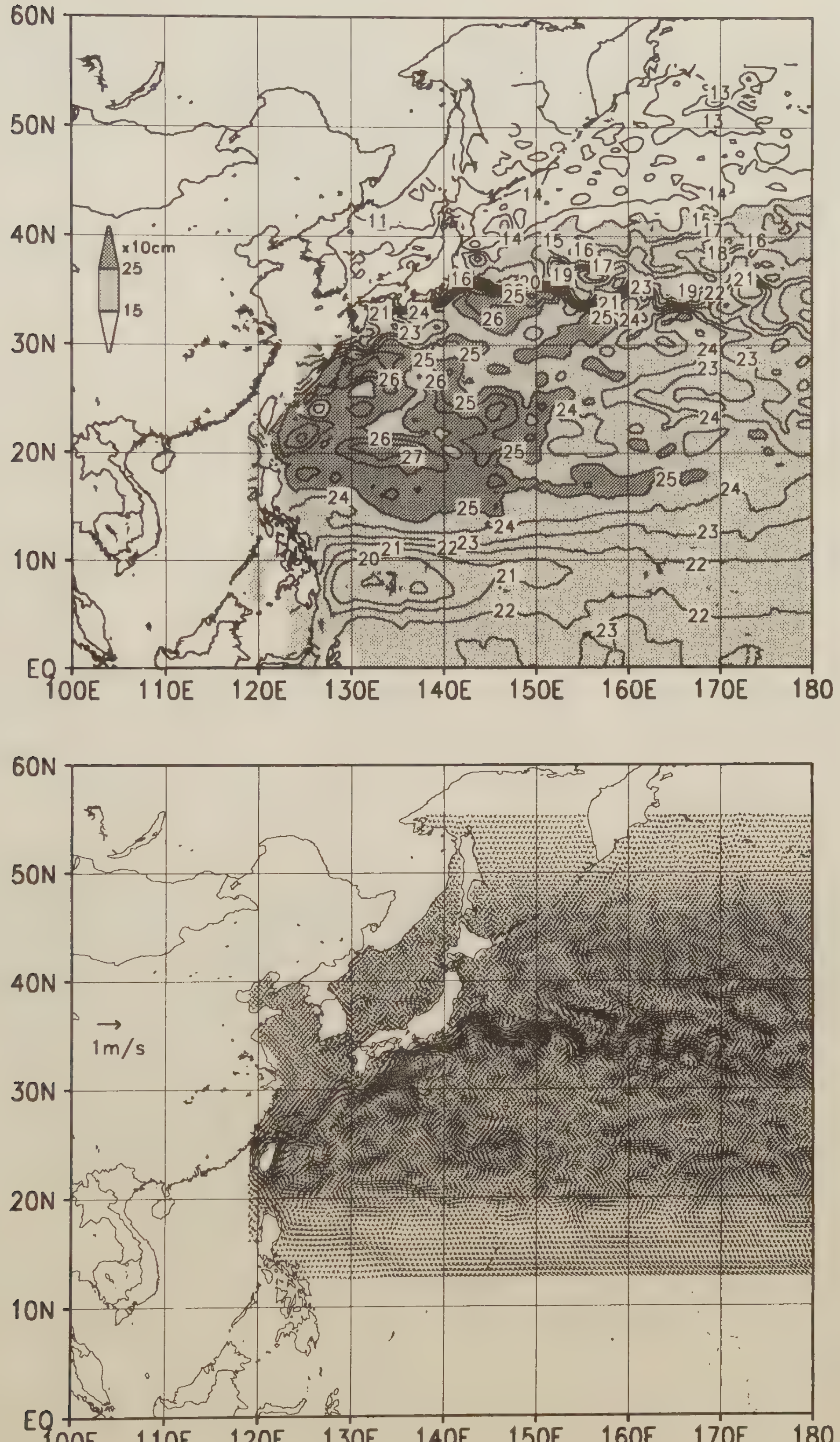
Fig. 8　Monthly mean subsurface (400 m) temperature (top) and current (bottom) in seas adjacent to Japan for April 2004. Contour interval is 1 ˚C (top). (calculated by the Ocean Comprehensive Analysis System)



第9図 旬別黒潮流軸図

Fig. 9 Location of the Kuroshio axis

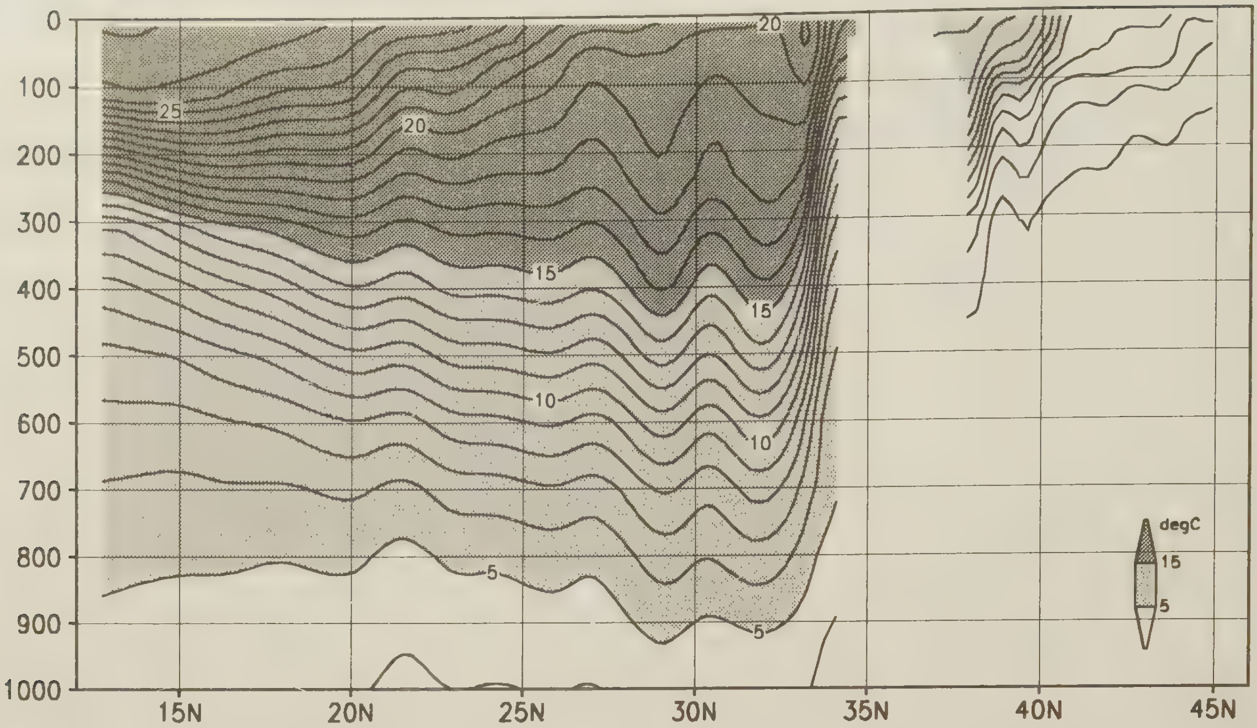
Dynamic Height / Sea Surface Current in the Western North Pacific



第 10 図　北西太平洋月平均海面高度分布図 (上) と海面海流図 (下) （2004 年 4 月）
（海洋総合解析システムによる）

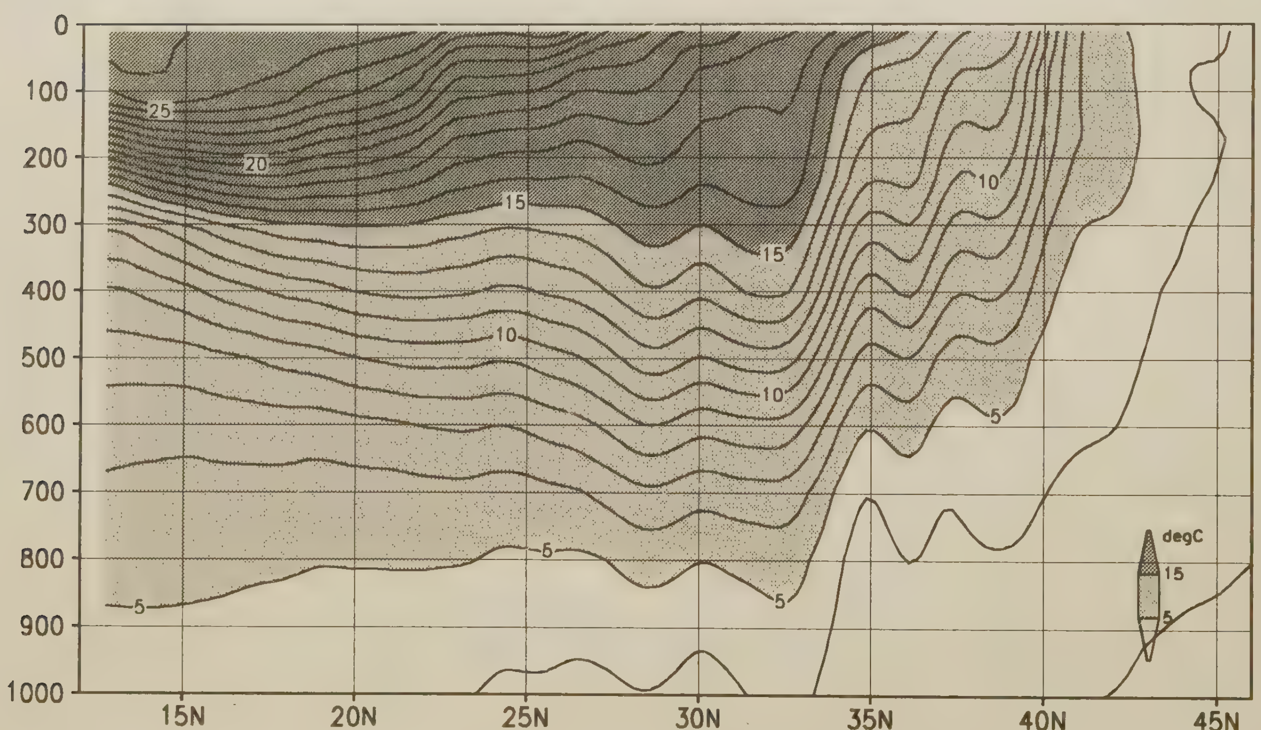
Fig. 10　Monthly mean sea surface height (top) and current (bottom) in the western North Pacific for April 2004. Contour interval is 10cm (top). (calculated by the Ocean Comprehensive Analysis System)

Depth-Latitude Sections of Temperature along 137E / 165E



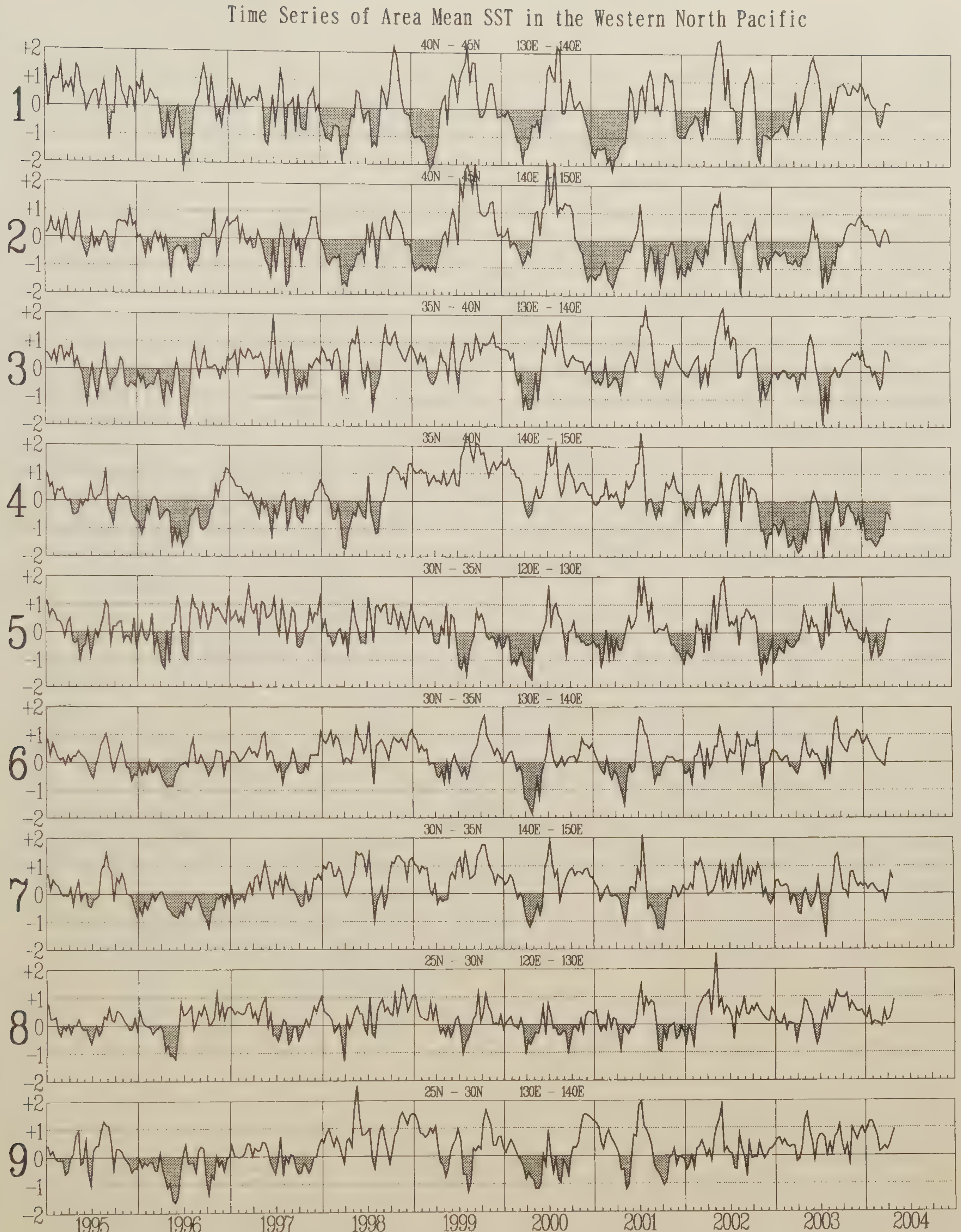
第 11 図　東経 137° 線に沿う月平均表層水温の鉛直断面図 （2004 年 4 月）
（海洋総合解析システムによる）

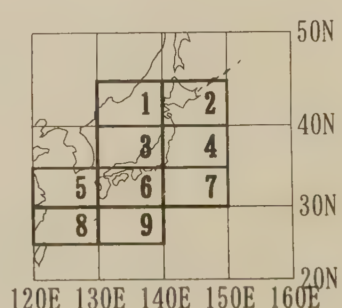
Fig. 11　Vertical cross section of monthly mean temperature along 137 °E for April 2004. Contour interval is 1 °C. (calculated by the Ocean Comprehensive Analysis System)



第 12 図　東経 165° 線に沿う月平均表層水温の鉛直断面図 （2004 年 4 月）
（海洋総合解析システムによる）

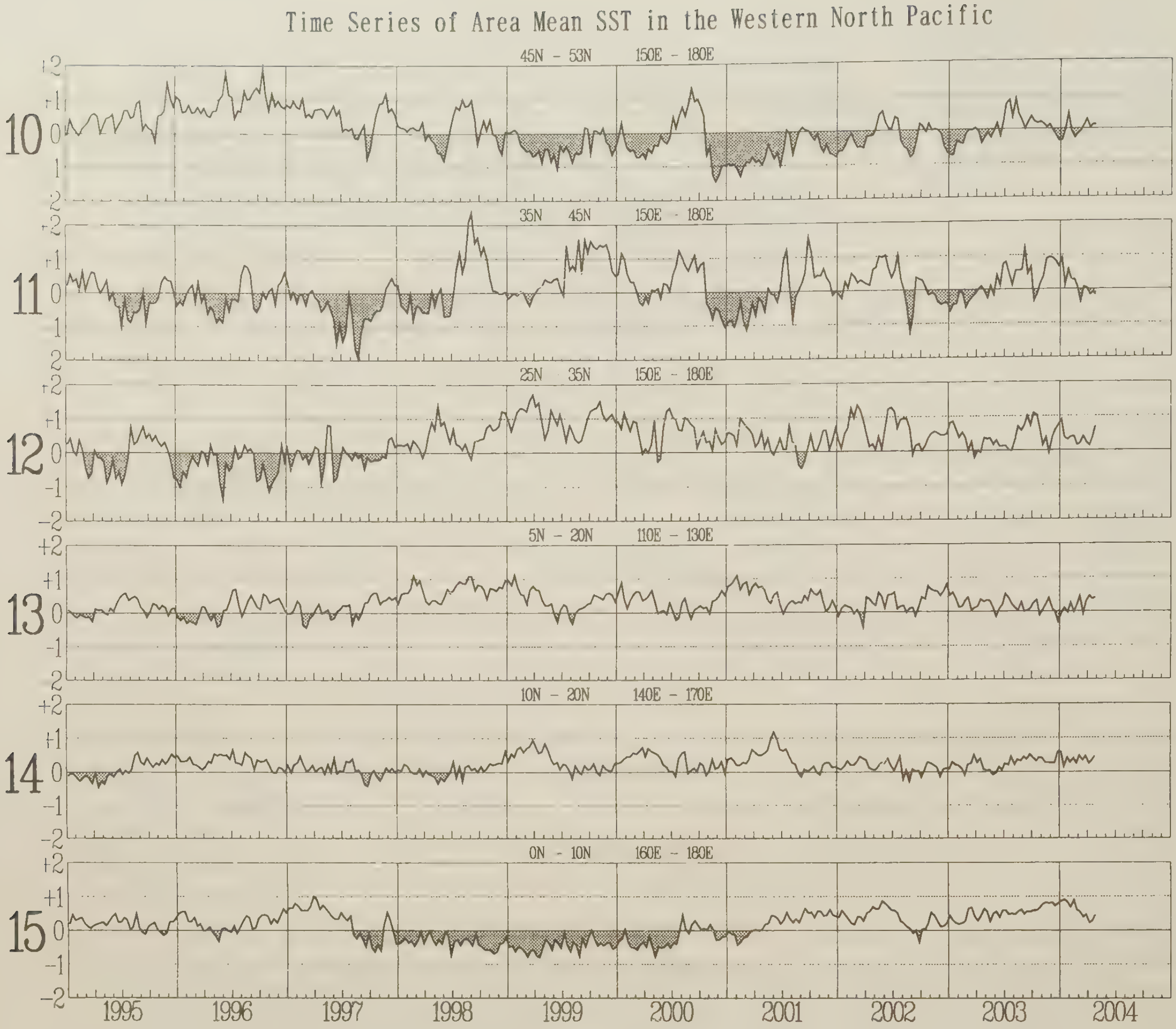
Fig. 12　Vertical cross section of monthly mean temperature along 165 °E for April 2004. Contour interval is 1 °C. (calculated by the Ocean Comprehensive Analysis System)





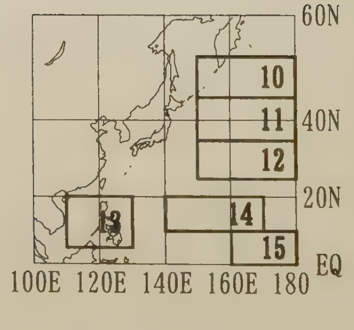
第13図　海域別旬平均海面水温平年偏差時系列図

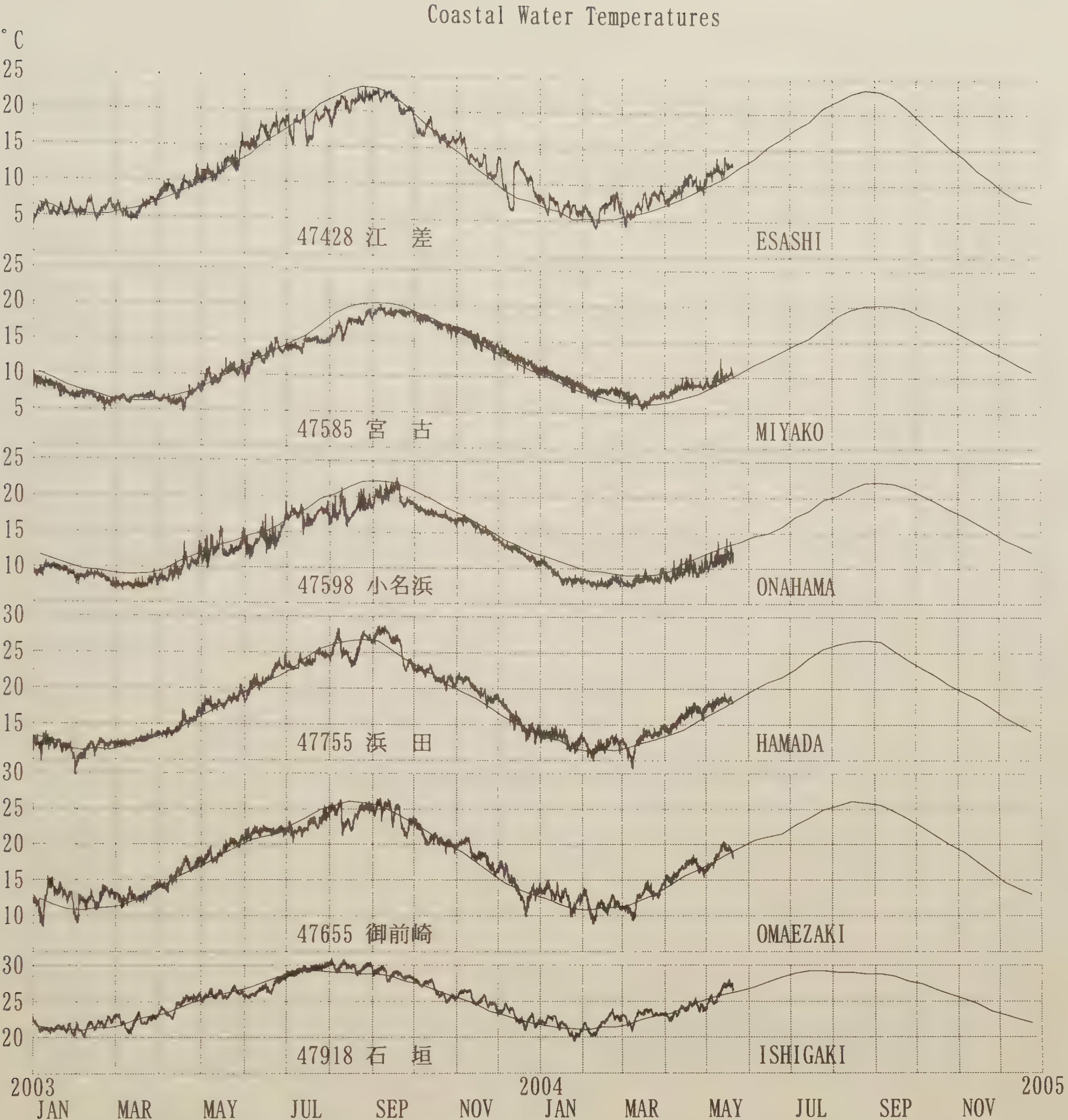
Fig. 13 Time series of the ten-day mean SST anomalies (°C) in the western North Pacific for the areas shown in the right panel. Negative anomalies are shaded. Anomalies are computed from the JMA climatology (1971-2000).



第13図　海域別旬平均海面水温平年偏差時系列図（つづき）

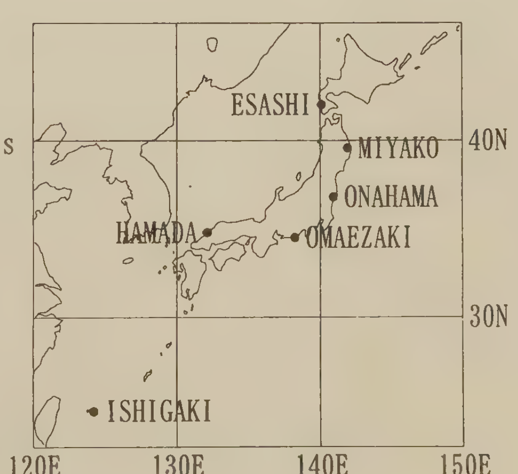
Fig. 13 (continue) Time series of the ten-day mean SST anomalies (°C) in the western North Pacific for the areas shown in the right panel. Negative anomalies are shaded. Anomalies are computed from the JMA climatology (1971-2000).

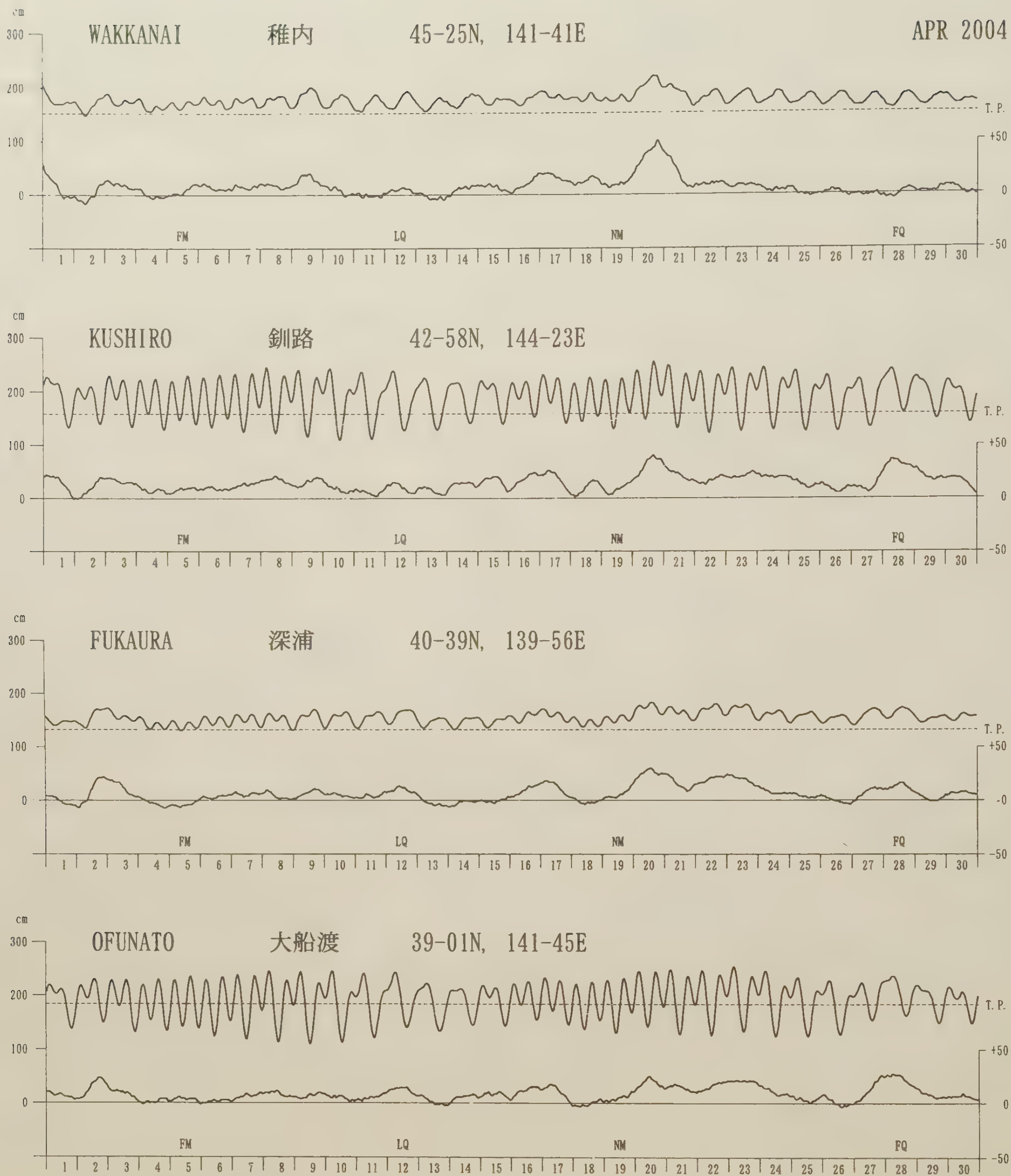




第14図 沿岸水温時系列図

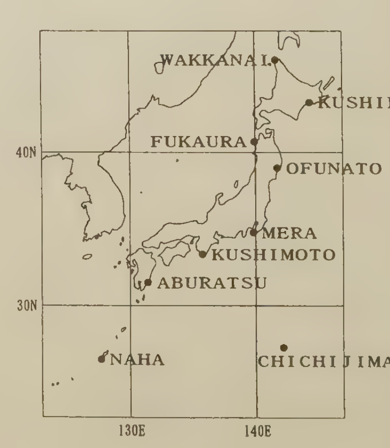
Fig. 14 Time series of hourly coastal water temperatures (°C) measured at 6 coastal stations of the JMA shown in the right panel.
Thin lines show ten-day mean climatology.





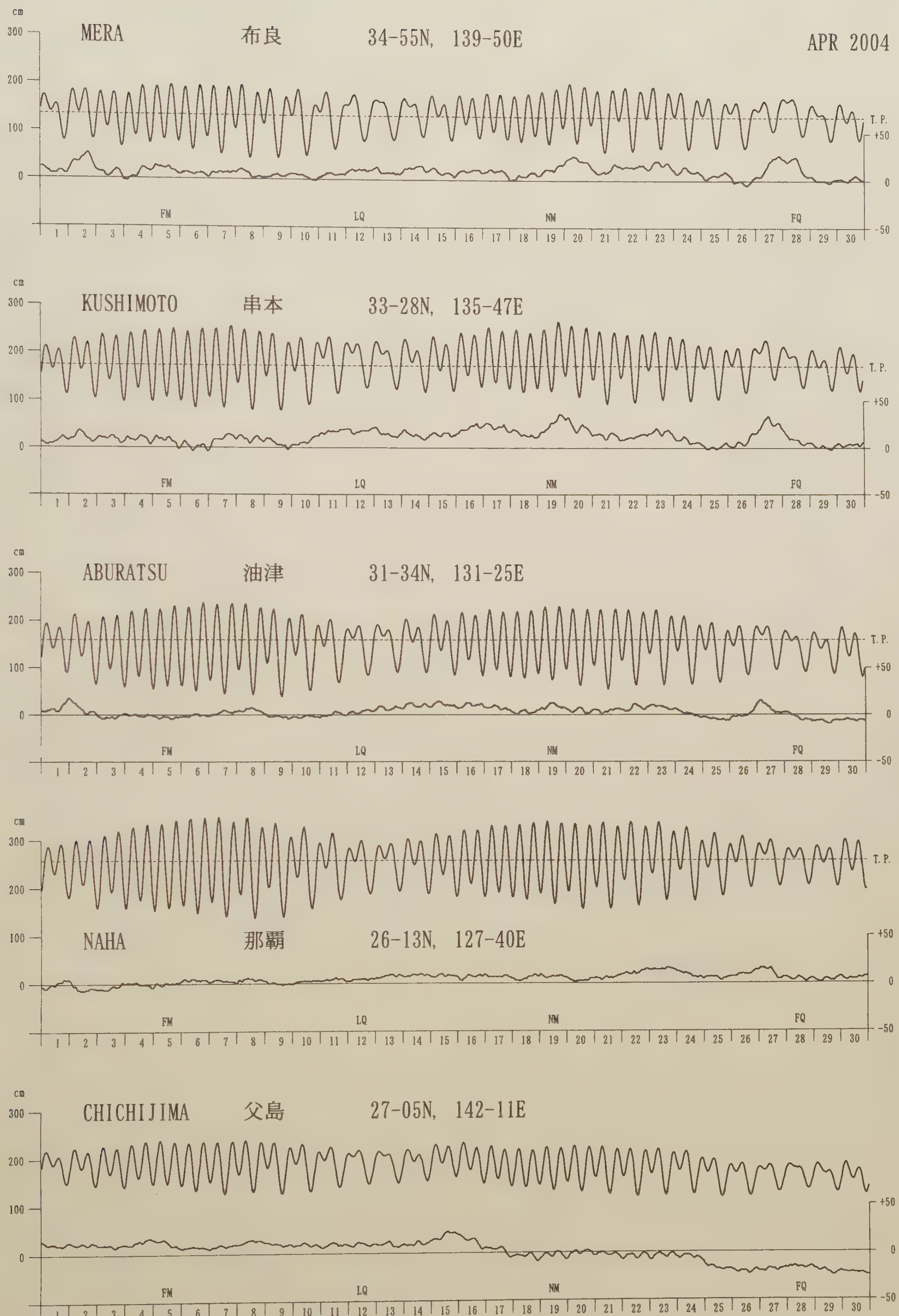
第15図 沿岸潮位時系列図（2004年 4月）

Fig. 15 Time series of hourly sea level observation (upper line) and its anomalies (lower line) at 9 stations of the JMA in the right panel.
Short term variations are removed from raw data.



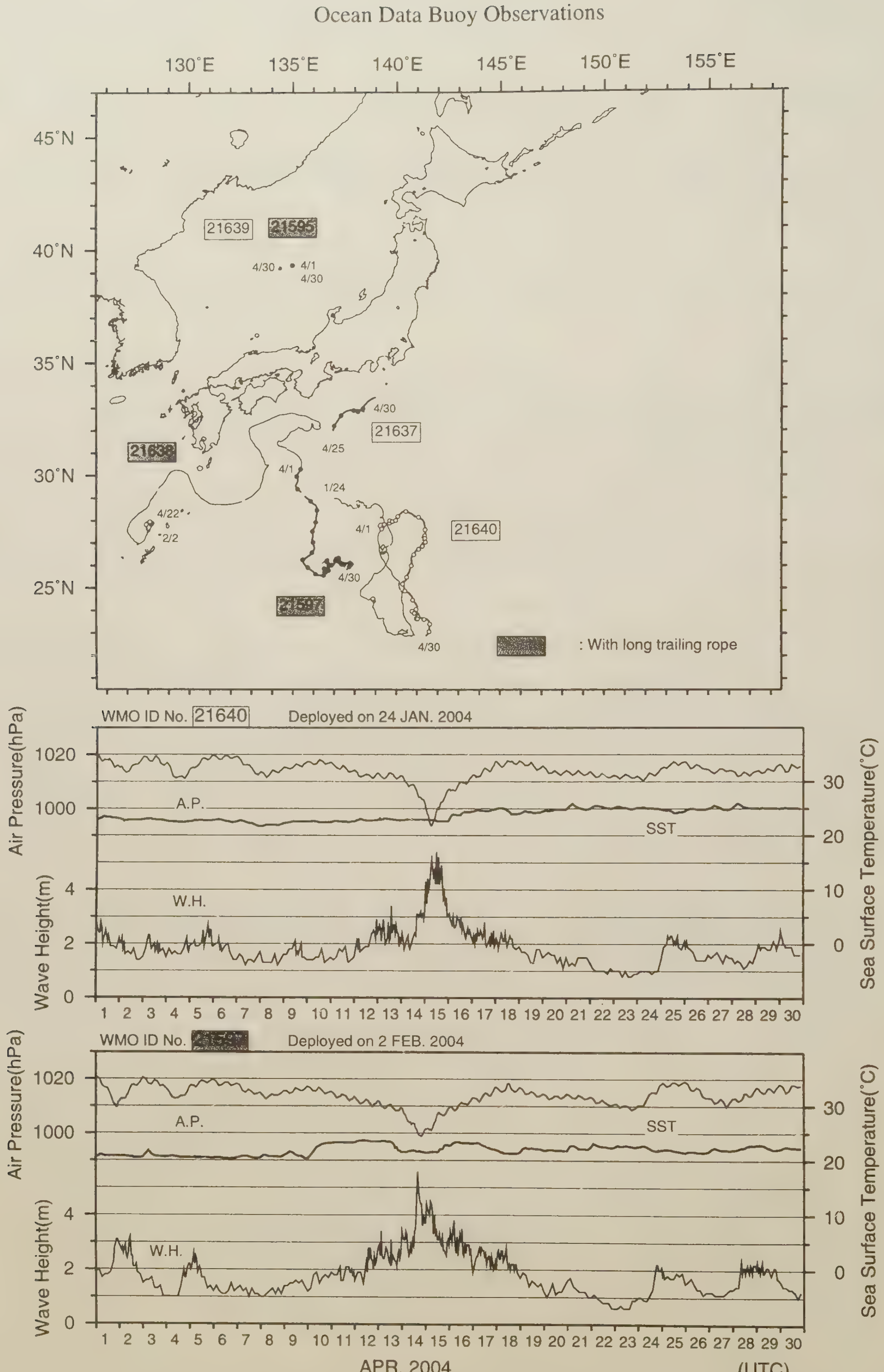
NM: new moon,　FQ: first quarter
FM: full moon,　LQ: last quarter
T. P. : Mean sea level of Tokyo Bay (Tokyo Peil)

Time series of Sea Level



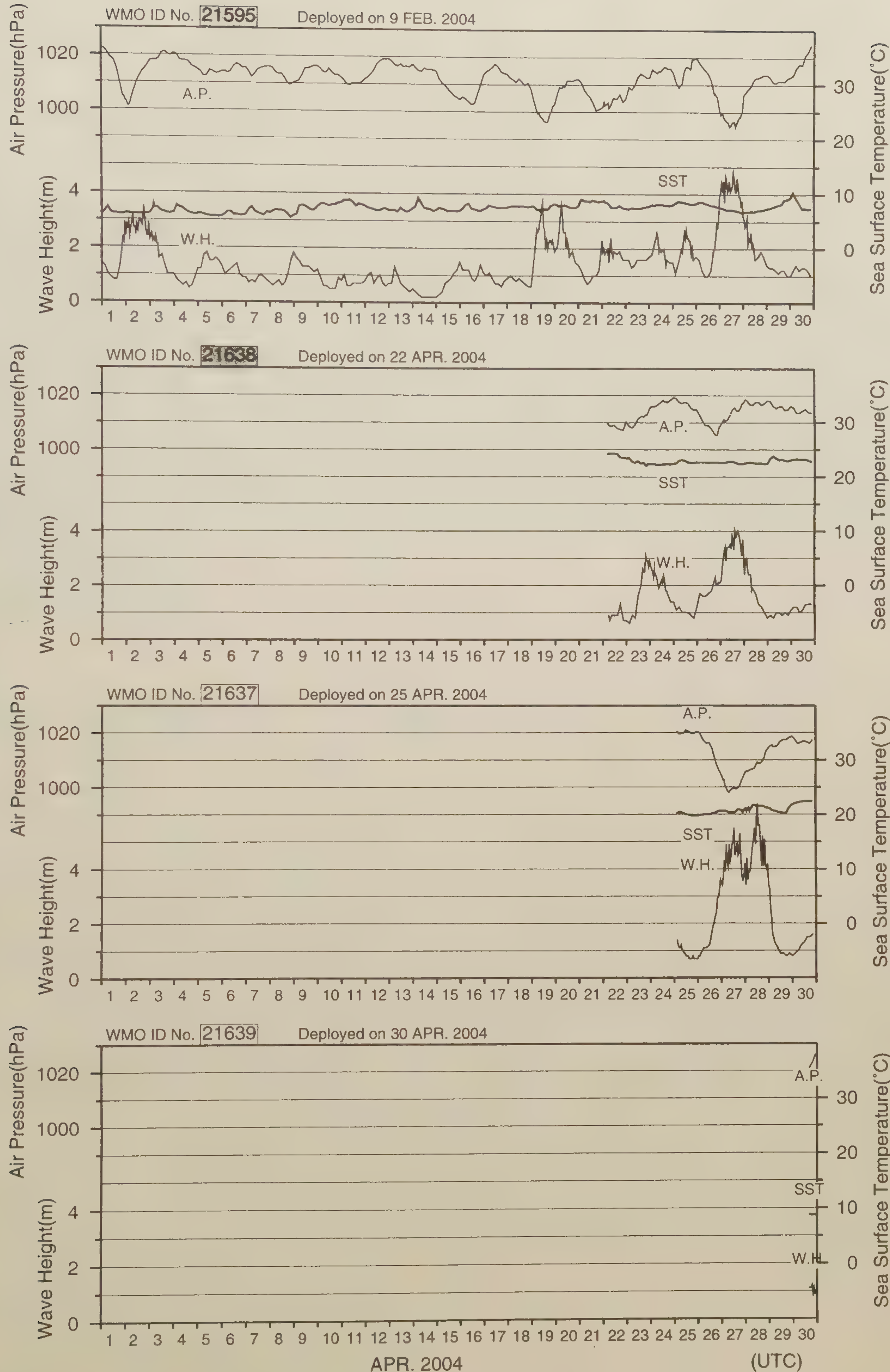
第15図 つづき

Fig. 15 continue



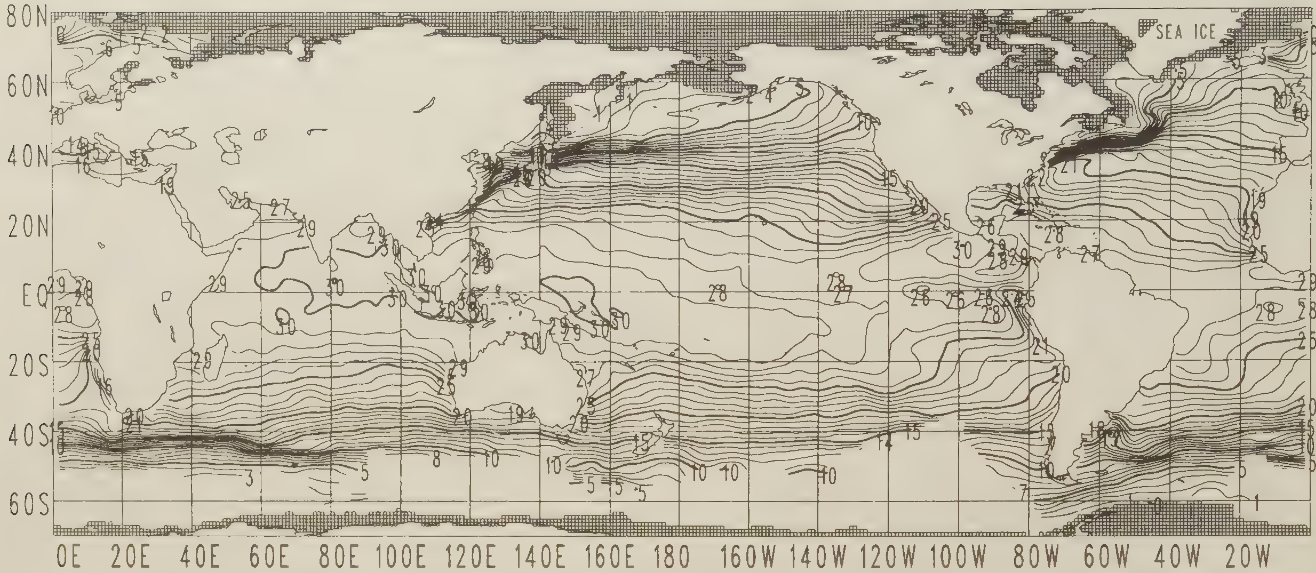
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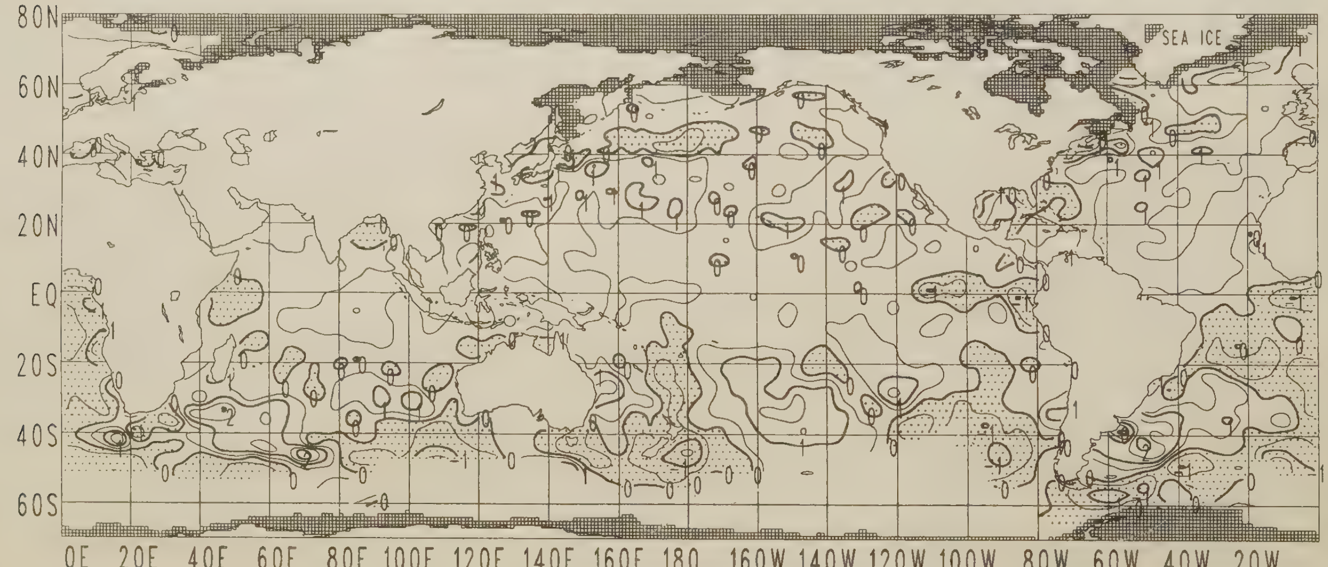
Fig.16　Time series of JMA drifting buoy observation.
The upper panel shows paths of the buoys. Circles denote the position at 00h UTC everyday.
The lower panel shows time series of observation data.



第16図 つづき
Fig.16 continue

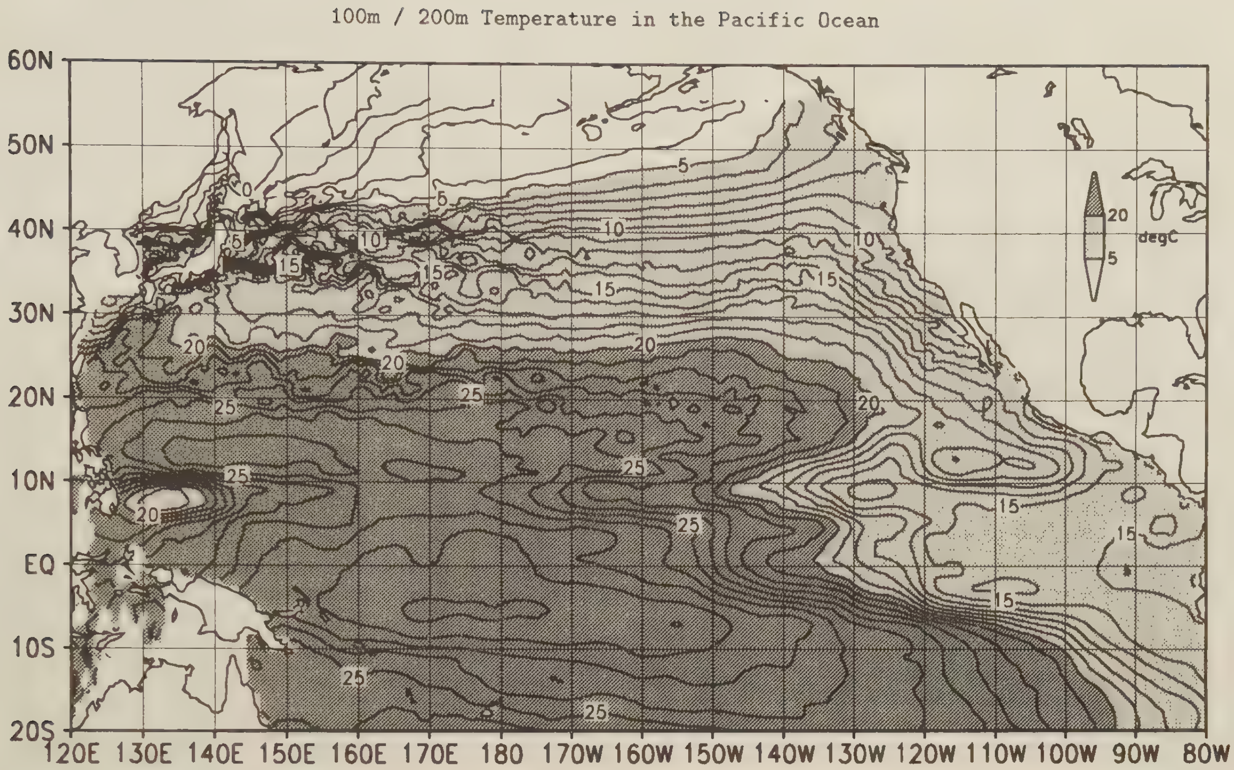
SST & Anomalies in the Global Ocean





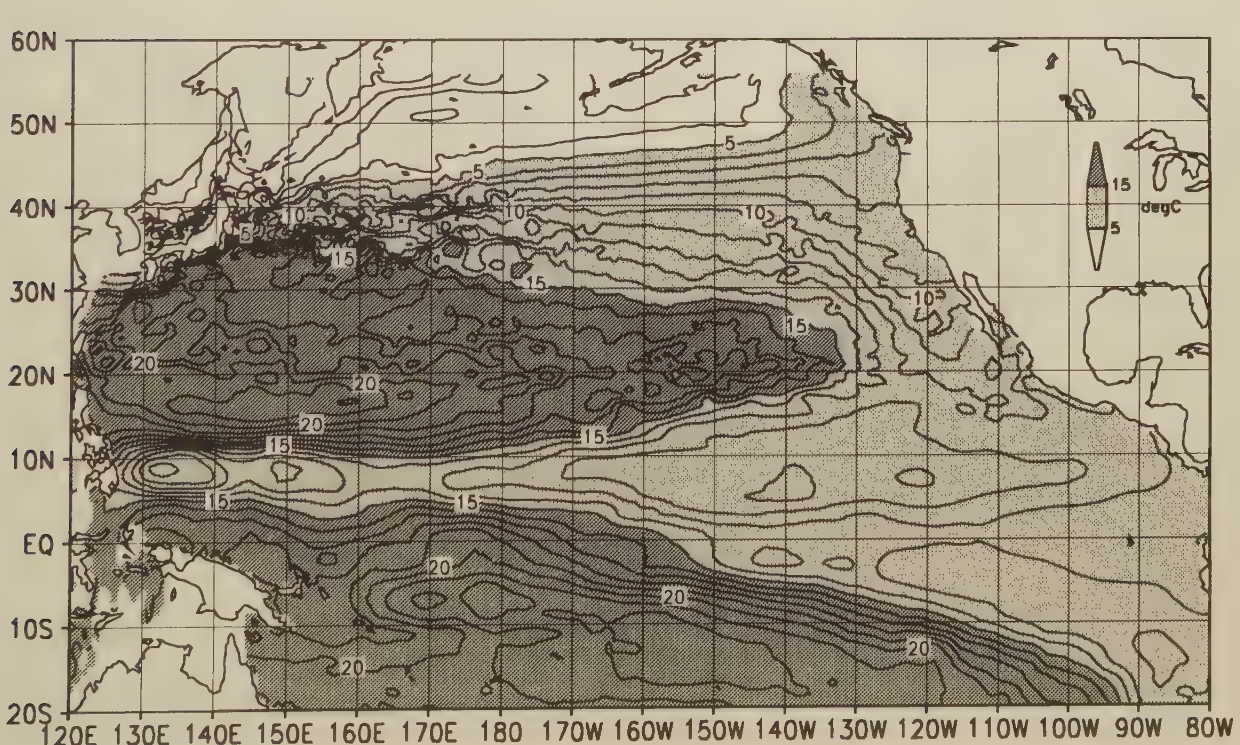
第17図　全球月平均海面水温図（上）及び偏差図（下）（2004年 4月）

Fig. 17 Monthly mean SST over the global ocean (top) and anomalies (bottom) for April 2004. Anomalies are computed from the JMA climatology (1971-2000). Contour interval is 1°C (top) and additional anomaly contours of ±0.5°C are shown by thin lines. Negative anomalies are spotted. Maximum coverage of sea ice is shaded. Data sources for sea ice are U.S. National Ice Center (polar regions) and JMA (the Sea of Okhotsk).



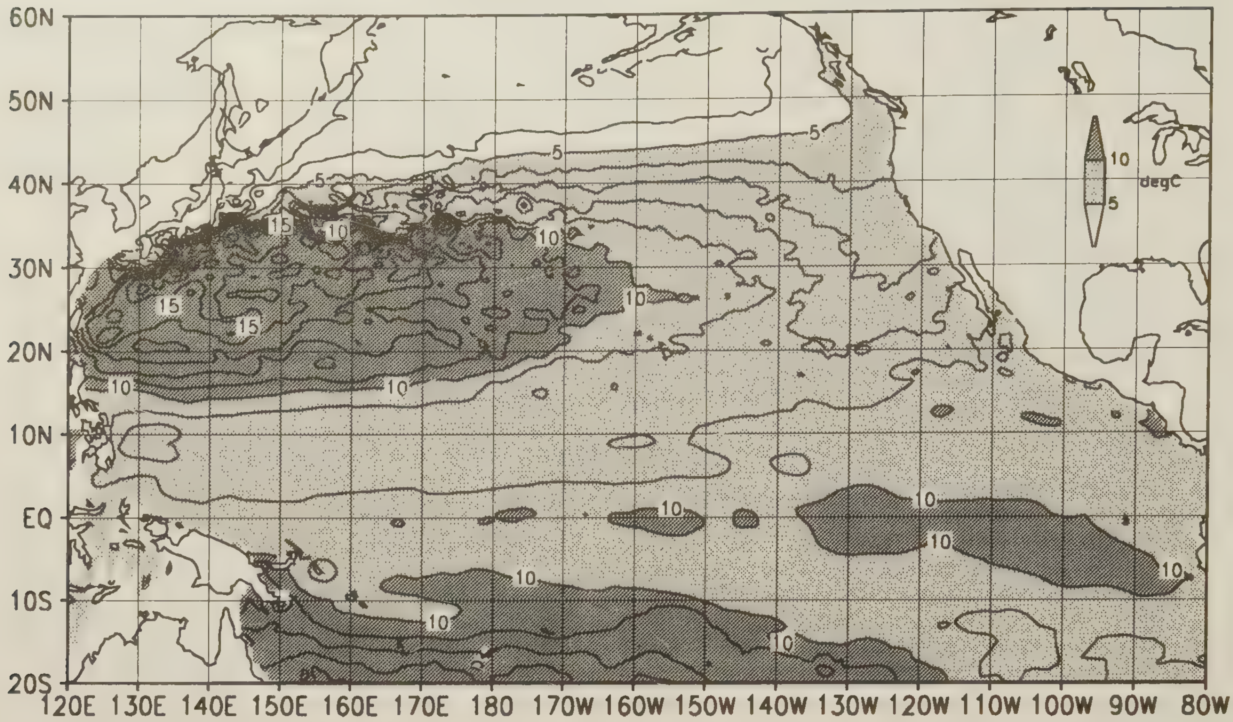
第 18 図　太平洋月平均表層水温図（深さ 100 m）　(2004 年 4 月)
（海洋総合解析システムによる）

Fig. 18　Monthly mean subsurface (100 m) temperature in the Pacific Ocean for April 2004. Contour interval is 1 ˚C. (calculated by the Ocean Comprehensive Analysis System)



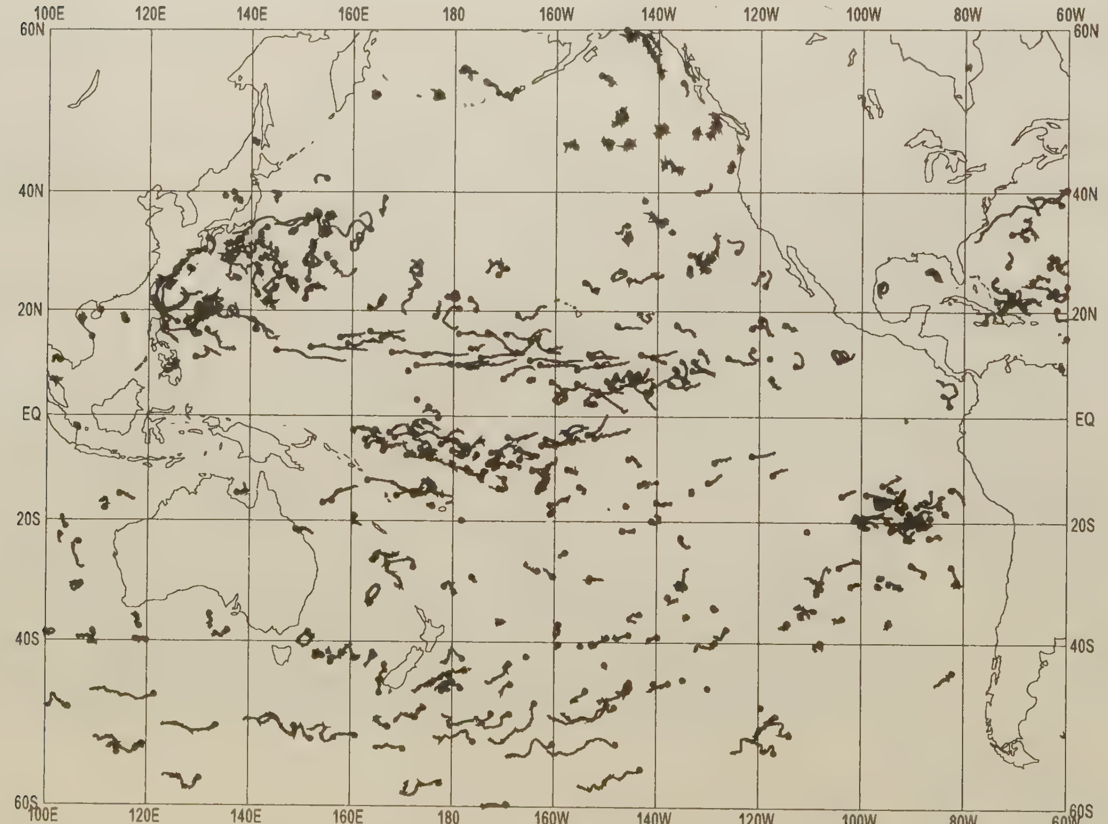
第 19 図　太平洋月平均表層水温図（深さ 200 m）　(2004 年 4 月)
（海洋総合解析システムによる）

Fig. 19　Monthly mean subsurface (200 m) temperature in the Pacific Ocean for April 2004. Contour interval is 1 ˚C. (calculated by the Ocean Comprehensive Analysis System)



第 20 図　太平洋月平均表層水温図（深さ 400 m）　(2004 年 4 月)
（海洋総合解析システムによる）

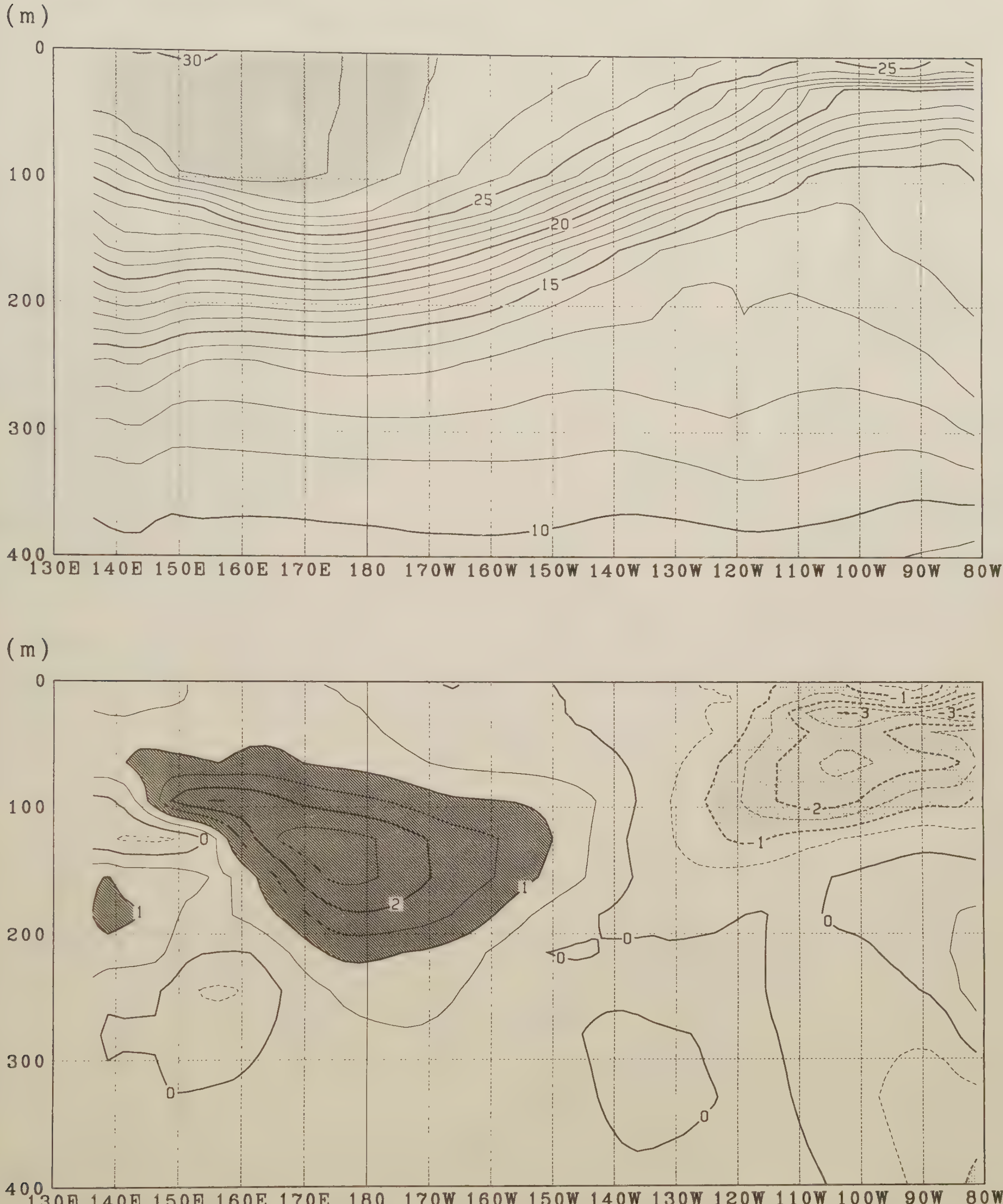
Fig. 20　Monthly mean subsurface (400 m) temperature in the Pacific Ocean for April 2004. Contour interval is 1 ˚C. (calculated by the Ocean Comprehensive Analysis System)



第 21 図　太平洋ブイ流跡図（2004 年 4 月）

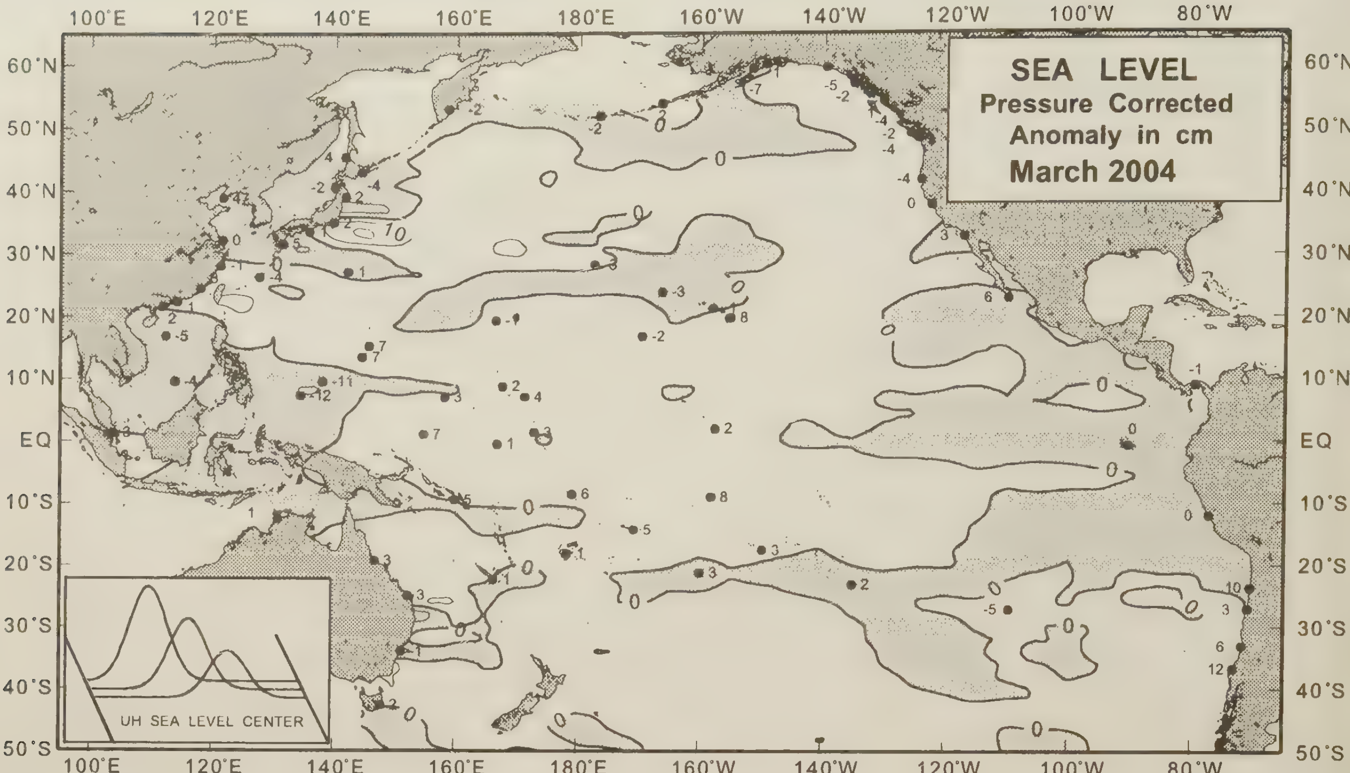
Fig. 21　Trajectories of drifting buoys in the Pacific Ocean during April 2004. Each track is for one buoy. Small circles represent the last positions for the month.

Depth-Longitude Sections of Equatorial Temperature & Anomalies



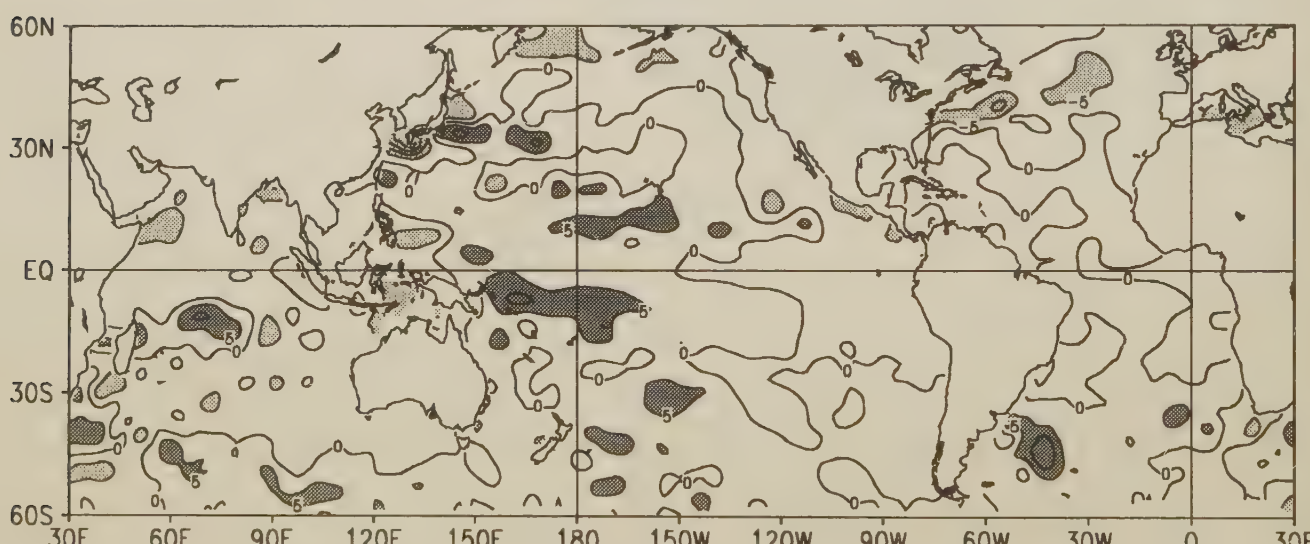
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Fig. 22 Depth-longitude sections of temperature (top) and anomalies (bottom) along the equator in the Pacific Ocean for April 2004. Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C (top) and 0.5°C (bottom). Values greater than 28°C in the top panel are shaded. In the bottom panel, values greater than 1°C are shaded and values less than -1°C are spotted. Anomalies are computed from 1987-2003 base period means.



第 23 図　太平洋月平均海面水位偏差図 （2004 年 3 月）

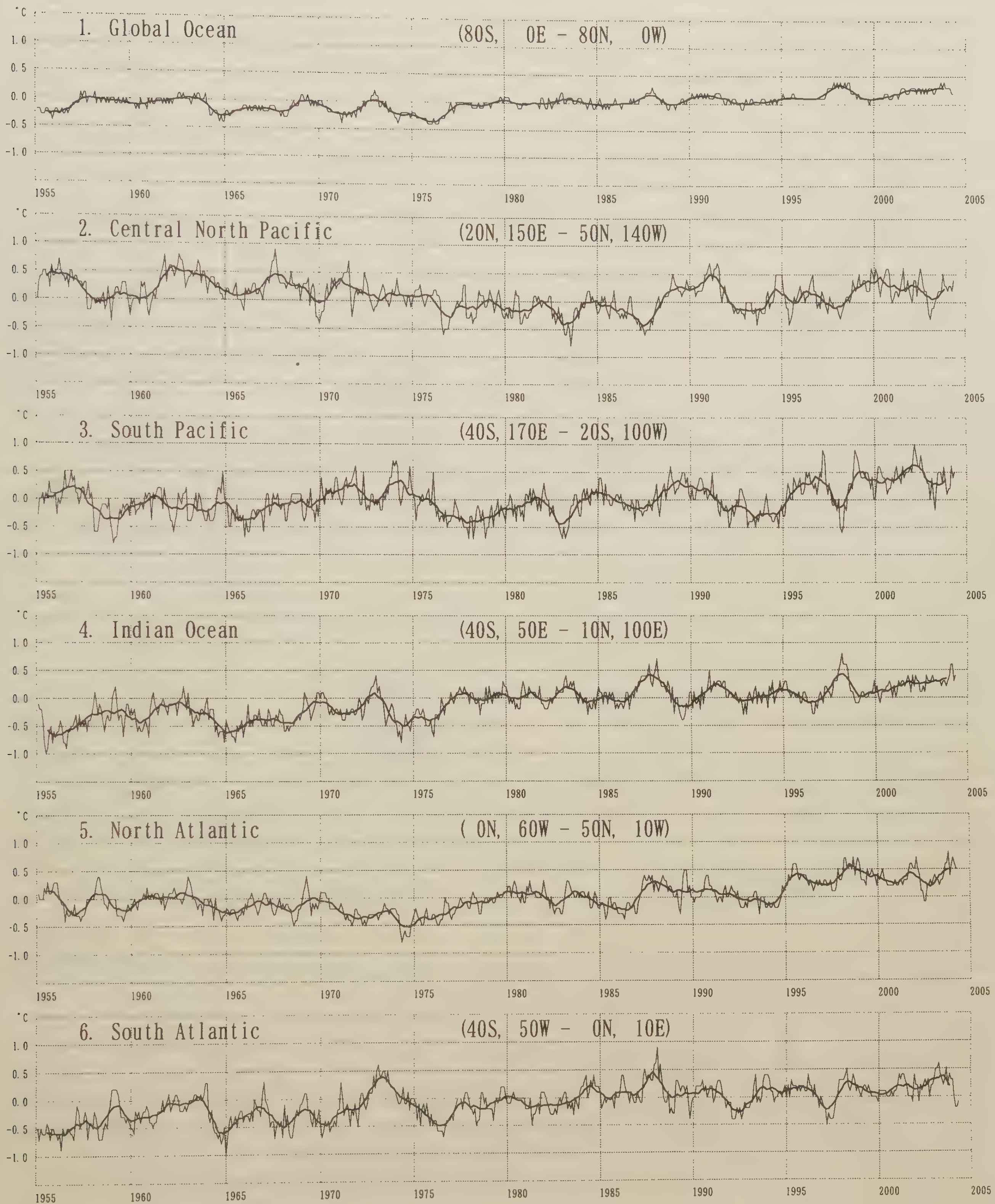
Fig. 23　Monthly sea level anomalies for March 2004 obtained from mean sea level (1993-2001) adjusted for atmospheric pressure. This figure is prepared by the SOC of ISLP-PAC, Department of Oceanography, University of Hawaii.



第 24 図　全球月平均海面高度偏差図 （2004 年 3 月）

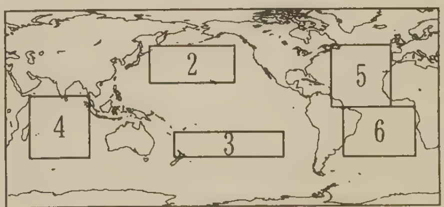
Fig. 24　Monthly sea surface height anomalies in the global ocean derived from the altimeter data of Jason-1 for March 2004. Contour interval is 5 cm. Positive anomalies exceeding +5 cm are shaded and negative anomalies exceeding -5 cm are spotted. Anomalies are computed from 1993-1998 base period means.

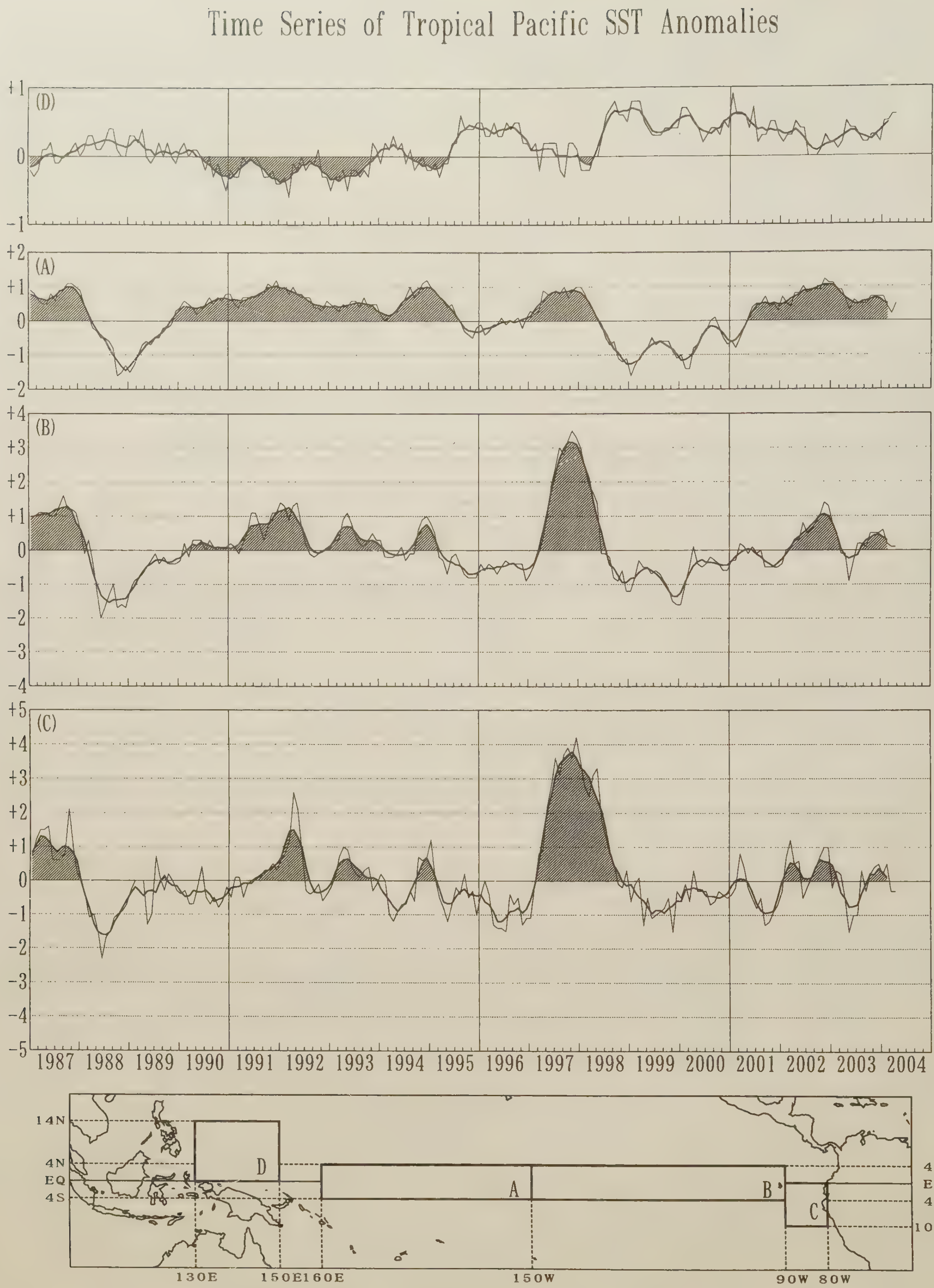
Long-term Variation of Monthly Mean SST Anomalies



第25図 海域平均海面水温偏差の長期変動

Fig. 25 Long-term variations of monthly mean sea surface temperature anomalies (°C) for the areas shown in the right panel. Anomalies are computed from the JMA climatology (1971-2000). Thin lines show the monthly mean and thick lines their 13-month running means.





第26図　太平洋熱帯域の海面水温偏差時系列図

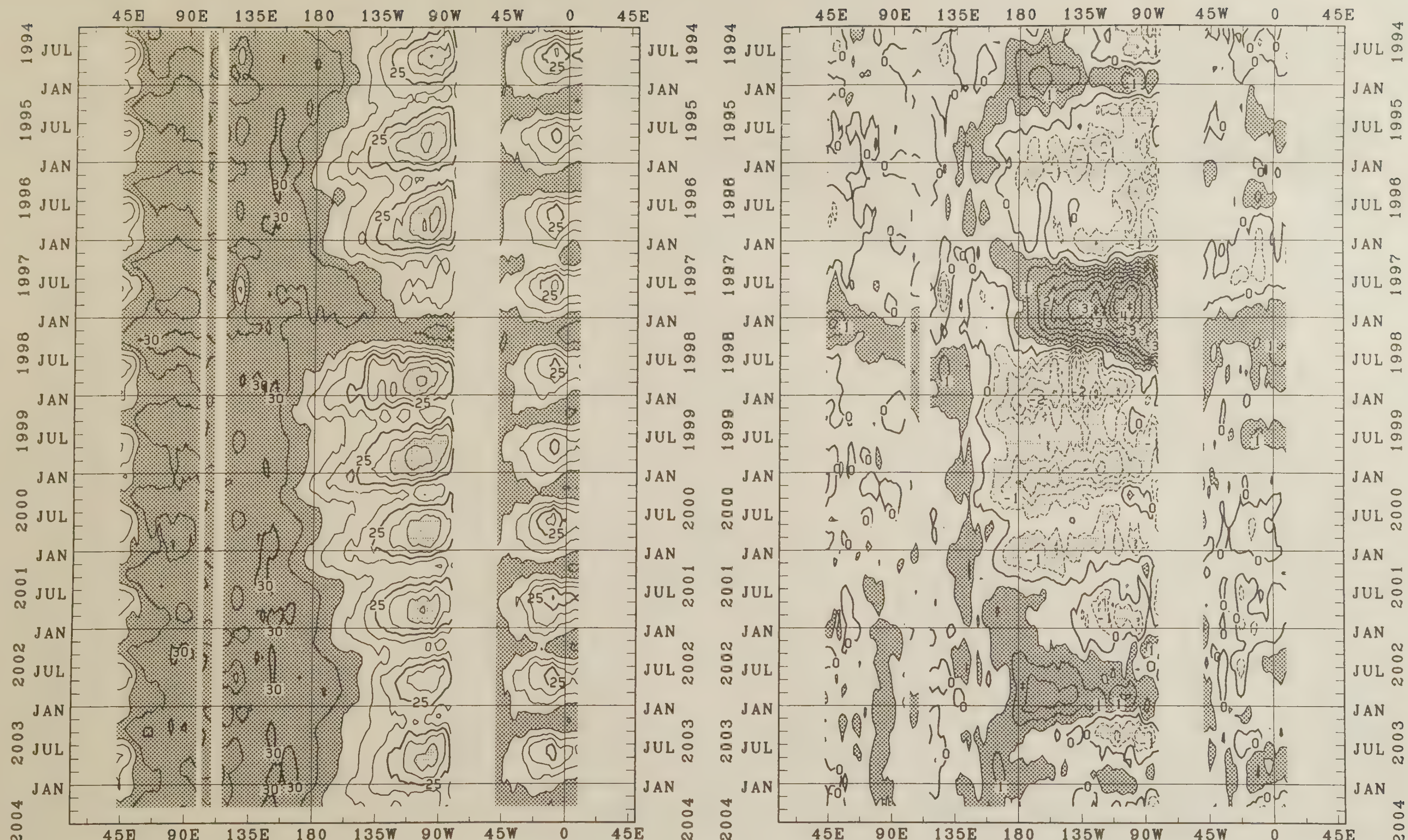
Fig. 26 Time series of monthly mean SST anomalies (°C) in the tropical Pacific Ocean for the areas indicated at the bottom panel. Thin lines show the monthly means and thick lines their 5-month running means. Positive anomalies (A, B, C) and negative anomalies (D) are shaded. Anomalies are computed from the JMA climatology (1971-2000).

	SEA SURFACE TEMPERATURE AND ANOMALY (°C)								SOI	SEA LEVEL PRESSURE ANOMALY (hPa)	
MONTH YEAR	REGION D 14N-EQ 130E-150E		REGION A 4N-4S 160E-150W		REGION B 4N-4S 150W-90W		REGION C EQ-10S 90W-80W		SOI	TAHITI 17-33S 149-37W	DARWIN 12-24S 130-52E
JAN 02	28.7	0.2	28.7	0.7	25.0	-0.4	24.2	-0.3	0.3	1.3	0.7
FEB 02	28.6	0.3	28.5	0.5	26.3	0.0	26.7	0.7	0.7	1.5	-0.2
MAR 02	28.8	0.3	28.5	0.4	27.2	0.1	27.5	1.2	-0.2	0.4	1.0
APR 02	29.3	0.5	29.0	0.8	27.5	0.3	25.9	0.5	-0.1	0.1	0.3
MAY 02	29.7	0.4	29.4	0.8	27.2	0.3	24.9	0.6	-1.3	-1.1	0.7
JUN 02	29.8	0.4	29.5	1.0	27.0	0.8	22.4	-0.5	-0.4	-0.2	0.4
JUL 02	29.3	0.0	29.3	0.8	25.9	0.5	21.7	-0.2	-0.7	0.5	1.6
AUG 02	29.2	0.0	29.3	0.9	25.3	0.6	21.0	0.1	-1.2	-1.4	0.5
SEP 02	29.3	0.0	29.3	0.9	25.5	0.8	20.9	0.4	-0.5	-0.3	0.8
OCT 02	29.5	0.1	29.3	0.9	25.7	1.0	21.6	0.7	-0.5	-1.0	-0.3
NOV 02	29.6	0.3	29.6	1.2	26.1	1.4	22.8	1.0	-0.4	0.1	1.0
DEC 02	29.2	0.2	29.3	1.1	26.3	1.3	23.9	1.0	-1.0	-0.1	1.7
JAN 03	28.7	0.2	29.1	1.1	26.2	0.8	24.3	-0.2	-0.1	-0.1	0.2
FEB 03	28.4	0.1	28.9	0.9	26.8	0.5	26.3	0.3	-0.5	-1.5	-0.2
MAR 03	28.7	0.2	29.0	0.9	27.0	-0.1	26.5	0.2	-0.3	-0.2	0.5
APR 03	29.3	0.5	28.8	0.6	27.1	-0.1	24.9	-0.5	-0.1	0.5	0.8
MAY 03	29.7	0.4	28.9	0.3	26.0	-0.9	22.8	-1.5	-0.6	-0.7	0.2
JUN 03	29.8	0.4	29.1	0.6	25.9	-0.3	21.9	-1.0	-0.9	-0.9	0.4
JUL 03	29.6	0.3	29.0	0.5	25.6	0.2	20.9	-1.0	0.2	0.7	0.3
AUG 03	29.4	0.2	28.9	0.5	24.9	0.2	21.2	0.3	0.0	-0.2	-0.1
SEP 03	29.5	0.2	28.9	0.5	24.8	0.1	20.2	-0.3	-0.1	-0.3	0.0
OCT 03	29.7	0.3	29.1	0.7	25.2	0.5	21.1	0.2	-0.1	-0.5	-0.4
NOV 03	29.6	0.3	29.1	0.7	25.2	0.5	22.2	0.4	-0.2	0.0	0.4
DEC 03	29.2	0.2	28.9	0.7	25.5	0.5	23.4	0.5	1.1	0.9	-1.1
JAN 04	29.0	0.5	28.7	0.7	26.0	0.6	24.7	0.2	-1.0	-1.5	0.9
FEB 04	28.8	0.5	28.4	0.4	26.5	0.2	26.5	0.5	0.8	1.4	-0.6
MAR 04	29.1	0.6	28.3	0.2	27.2	0.1	26.0	-0.3	0.1	-0.7	-1.3
APR 04	29.4	0.6	28.7	0.5	27.3	0.1	25.1	-0.3	-1.4	-1.0	1.3

第1表　太平洋熱帯域の大気及び海洋の監視指数

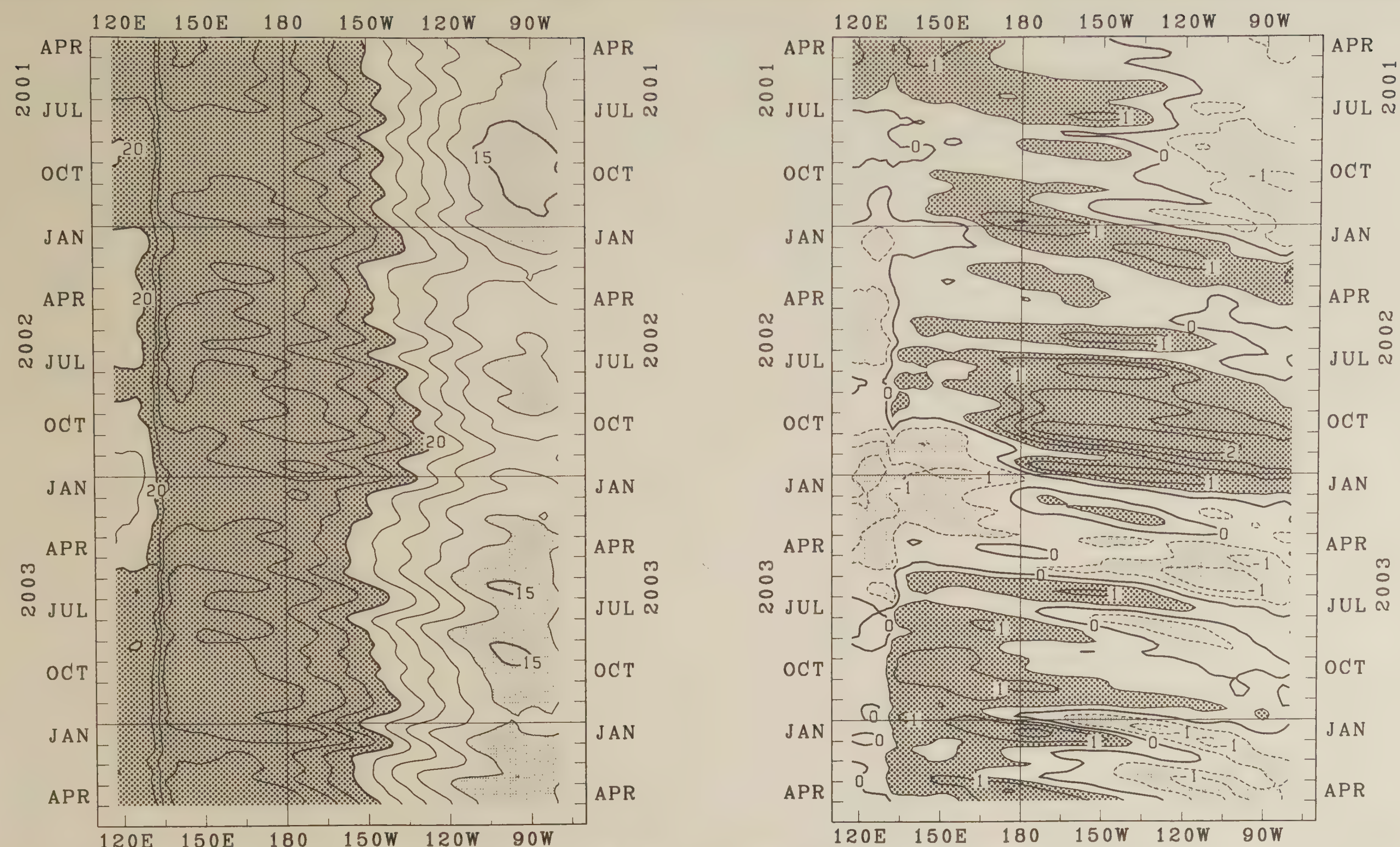
Table 1 Atmospheric and oceanic monitoring indices in the tropical Pacific Ocean

Time-Longitude Section of SST & Anomalies



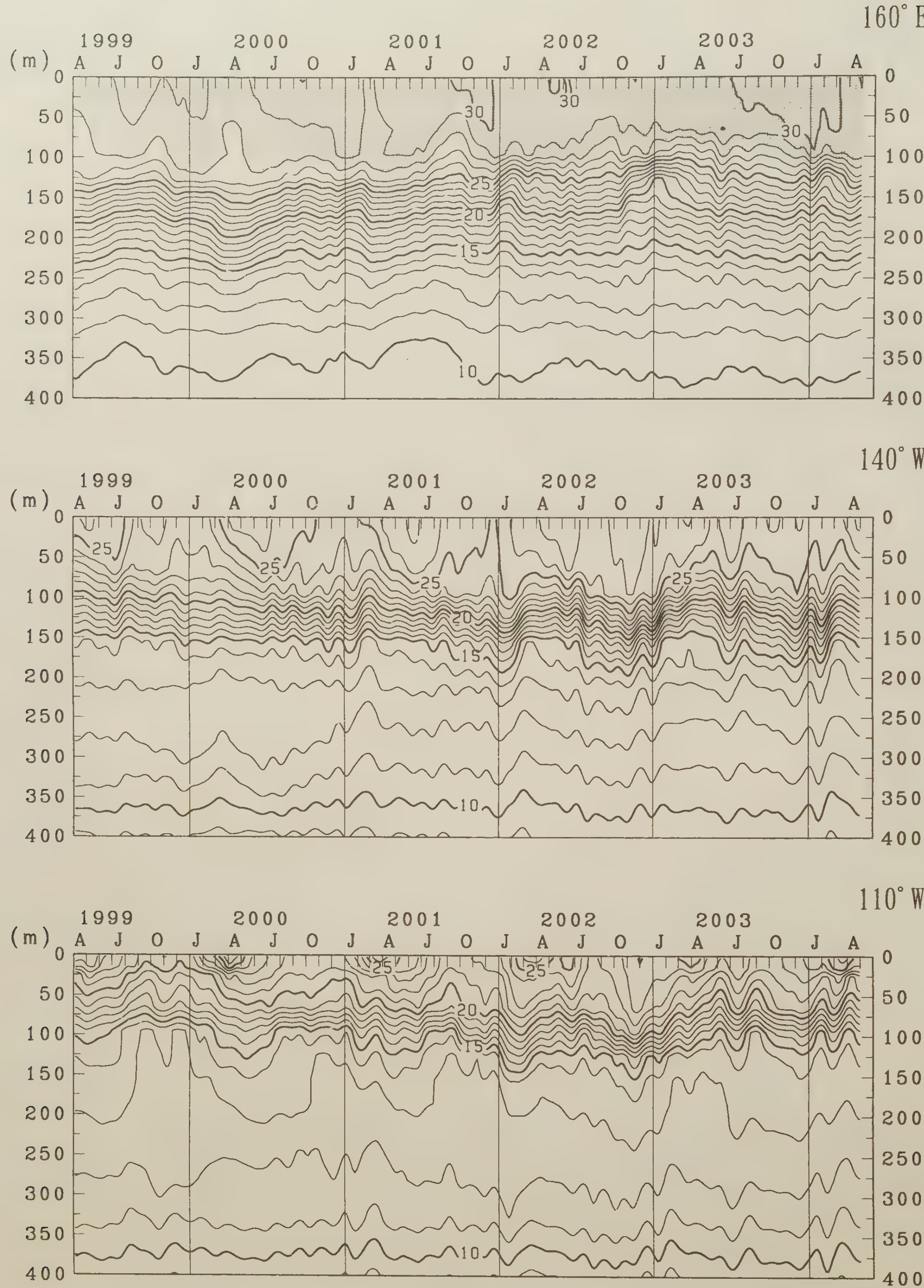
第 27 図　赤道に沿った海面水温（左）および偏差（右）の時間-経度断面図

Fig. 27　Time-longitude sections of SSTs (left) and anomalies (right) along the equator (2 °N-2 °S) in the global ocean. Contour interval is 1 °C (left) and 0.5 °C (right). Values greater than 28 °C (+0.5 °C) are shaded and values less than 23 °C (-0.5 °C) are spotted in the left (right) panel. Dashed contours indicate negative anomalies in the right panel. Anomalies are computed from 1971-2000 base period means.



第28図　太平洋の赤道に沿う海洋表層の貯熱量（左）及び偏差（右）の時間－経度断面図

Fig. 28 Time-longitude sections of ocean heat content in the upper 260 m along the equator (left) and anomalies (right) in the Pacific Ocean. Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C (left) and 0.5°C (right). Values greater than 20°C (+0.5°C) are shaded and values less than 16°C (-0.5°C) are spotted in the left (right) panel. Dashed contours indicate negative anomalies in the right panel. Anomalies are computed from 1987-2003 base period means.



第29図　太平洋赤道域の表層水温の時間－深度断面図

（上：西部、中：中部、下：東部）

Fig. 29 Time-depth sections of equatorial subsurface temperature for the western Pacific (top, 160°E), the central Pacific (middle, 140°W) and the eastern Pacific (bottom, 110°W). Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C. Values greater than 28°C are shaded.

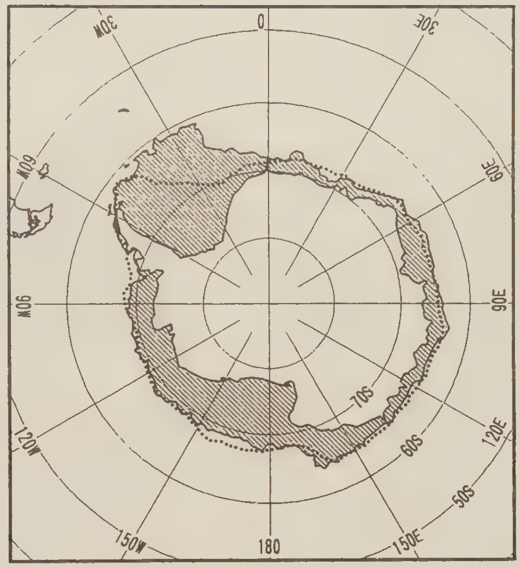


第30-1図　北極域の海氷図（2004年 4月16日）

Fig.30-1 Sea ice chart in the Arctic on 16 Apr. 2004.

The shaded area represents the sea ice extent. The dotted line denotes the mean ice edge averaged for the period from 1972 through 1990.

The data source is the National Ice Center (USA).

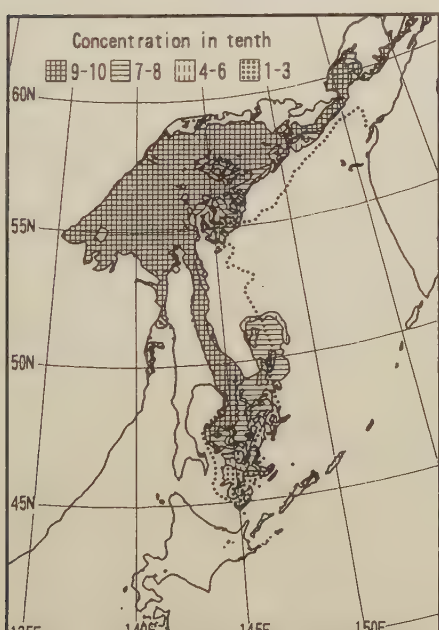


第30-2図　南極域の海氷図（2004年 4月16日）

Fig.30-2 Sea ice chart in the Antarctic on 16 Apr. 2004.

The shaded area represents the sea ice extent. The dotted line denotes the mean ice edge averaged for the period from 1973 through 1990.

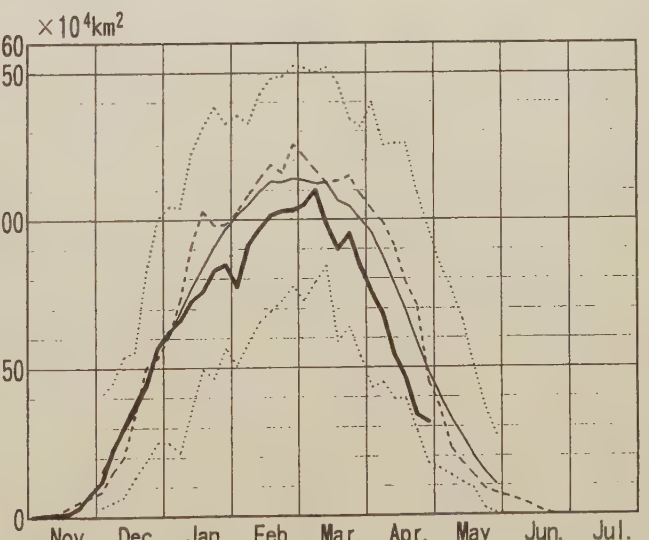
The data source is the National Ice Center (USA).



第30-3図 オホーツク海の海氷図（2004年 4月15日）

Fig.30-3 Sea ice chart in the Sea of Okhotsk on 15 Apr. 2004.

The dotted line denotes the mean ice edge averaged for the period from 1971 through 2000.

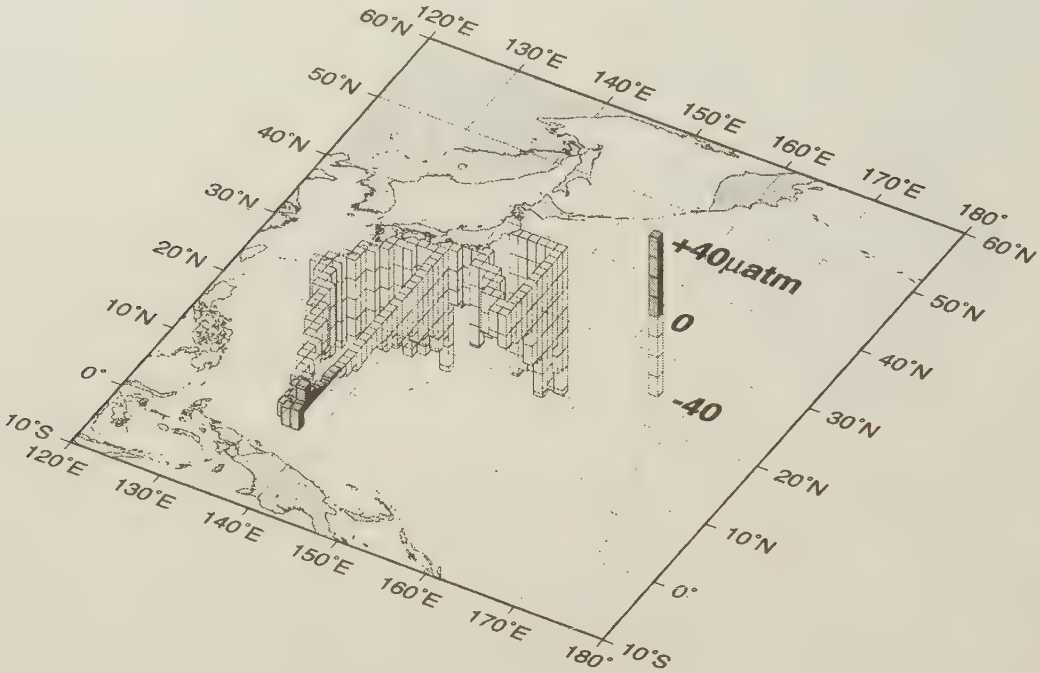


第30-4図 オホーツク海の海氷域面積

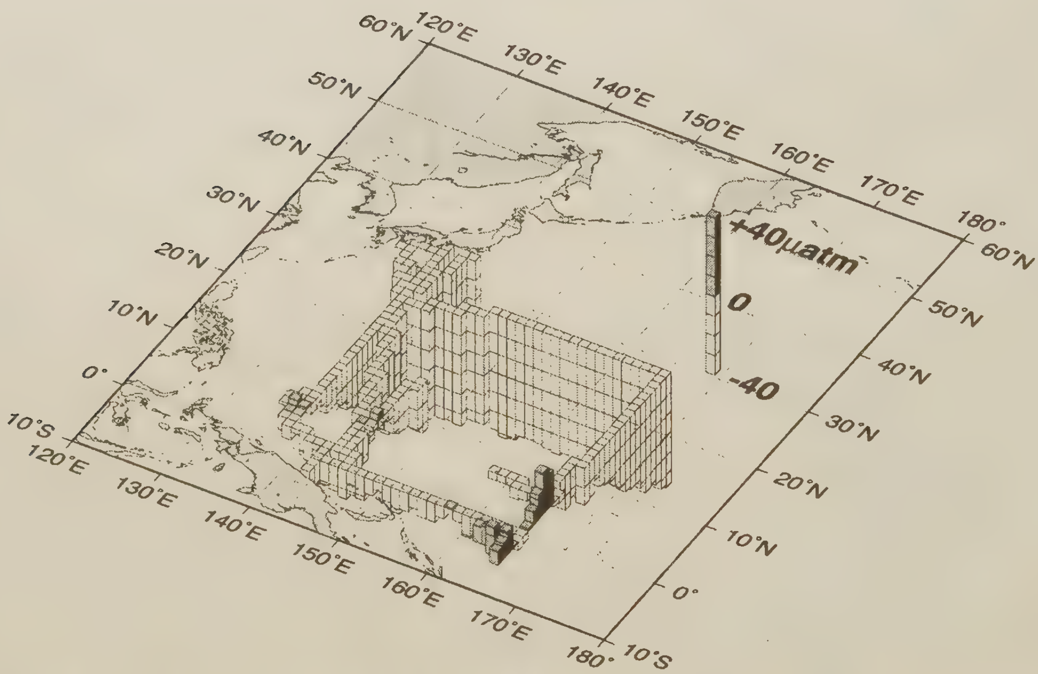
Fig.30-4 Time series of 5-day sea ice area in the Sea of Okhotsk.

- ———— : current season (2003/2004)
- ———— : mean extent (1971–2000)
- ………… : maximum or minimum extent (1971–2003)
- - - - - - : last season (2002/2003)

(a)

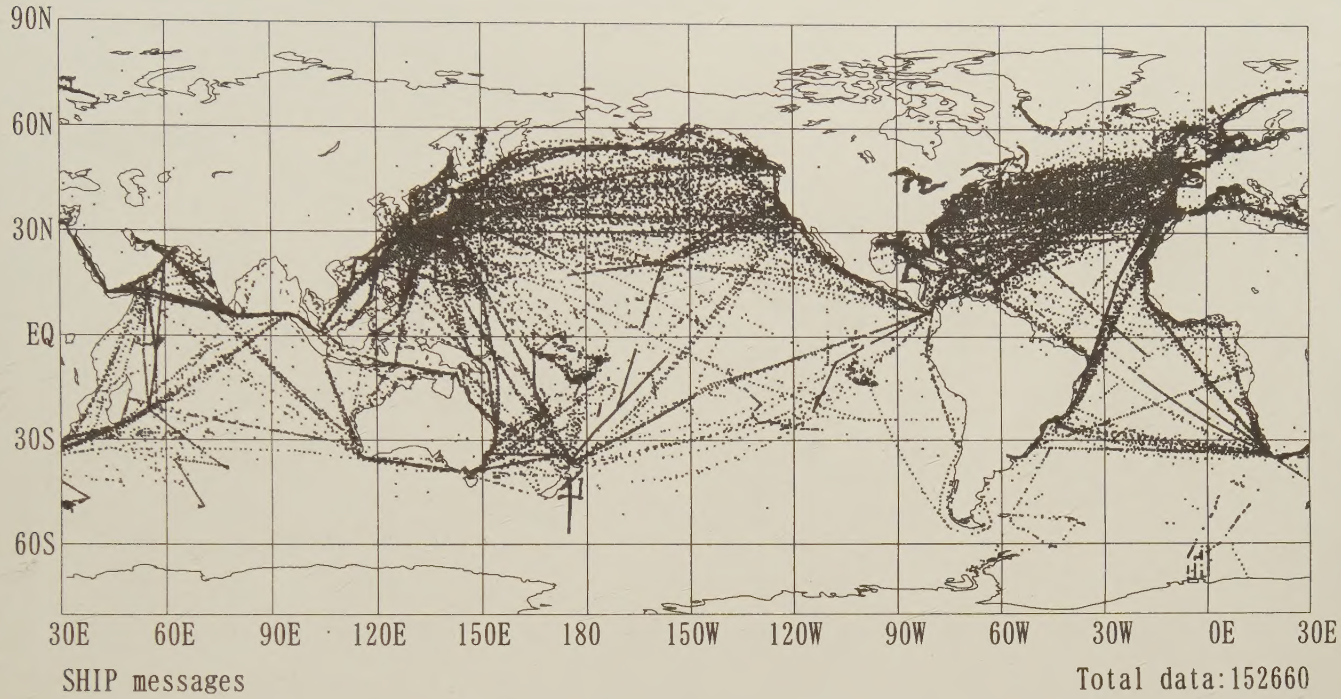


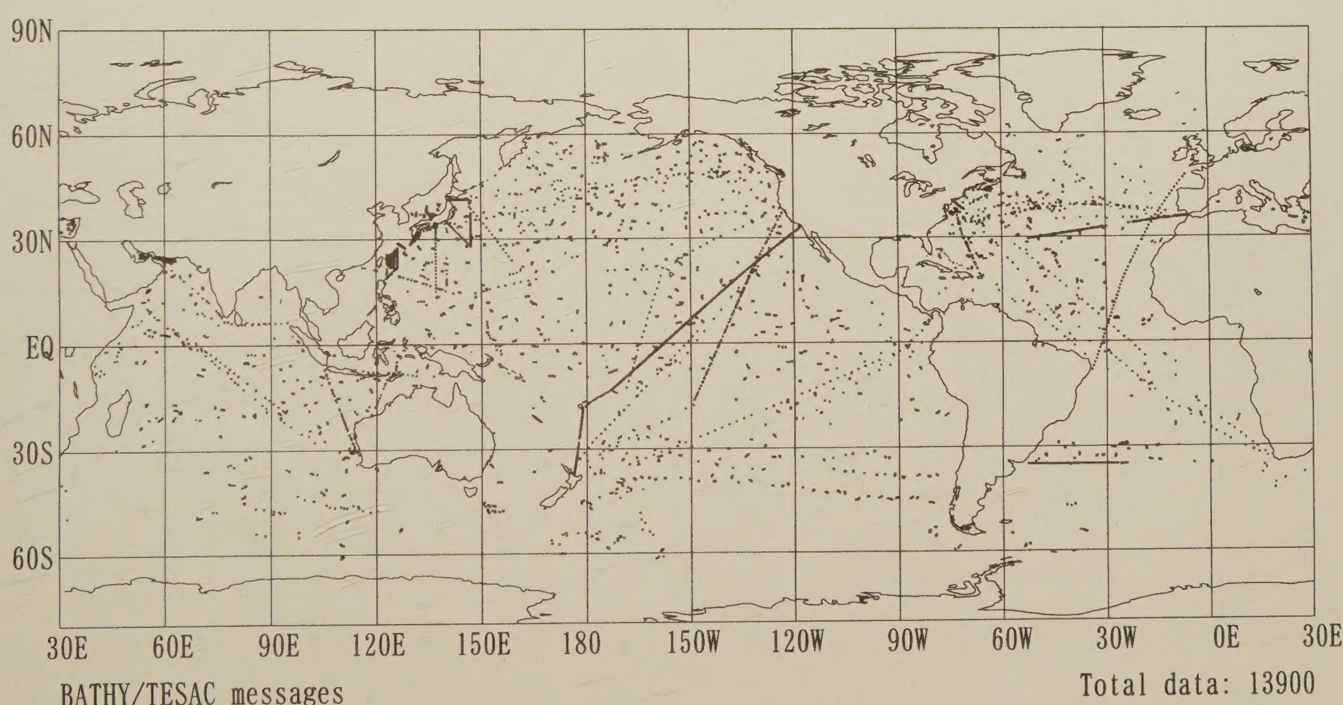
(b)



第31図　気象庁「凌風丸」及び神戸海洋気象台「啓風丸」が、(a)2003年10月7日から11月28日にかけてと、(b)2004年1月14日から3月9日にかけて北西太平洋で観測した洋上大気中と表面海水中とのCO_2の濃度差。棒グラフは、海洋から大気へCO_2を放出する場合を濃い陰影、海洋が大気のCO_2を吸収する場合を薄い陰影に示してある。

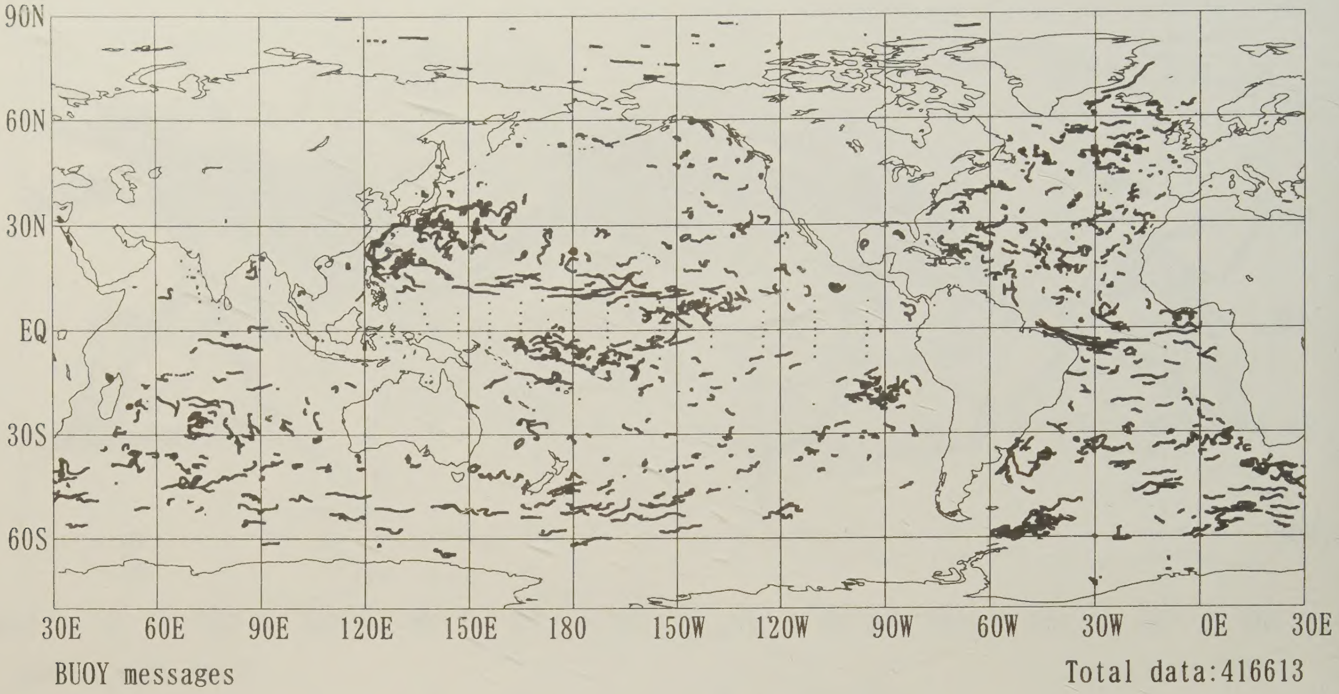
Fig. 31　Difference in the CO_2 concentration between the surface water and the overlying atmosphere in the western North Pacific observed by the R/V Ryofu Maru of the JMA and the R/V Keifu Maru of the Kobe Marine Observatory, (a) from October 7 to November 28, 2003 and (b) from January 14 to March 9, 2004. Darker-shaded upward pillars indicate that the oceanic CO_2 was emitted into the atmosphere, and lighter-shaded downward pillars indicate that the atmospheric CO_2 was absorbed into the ocean, respectively.

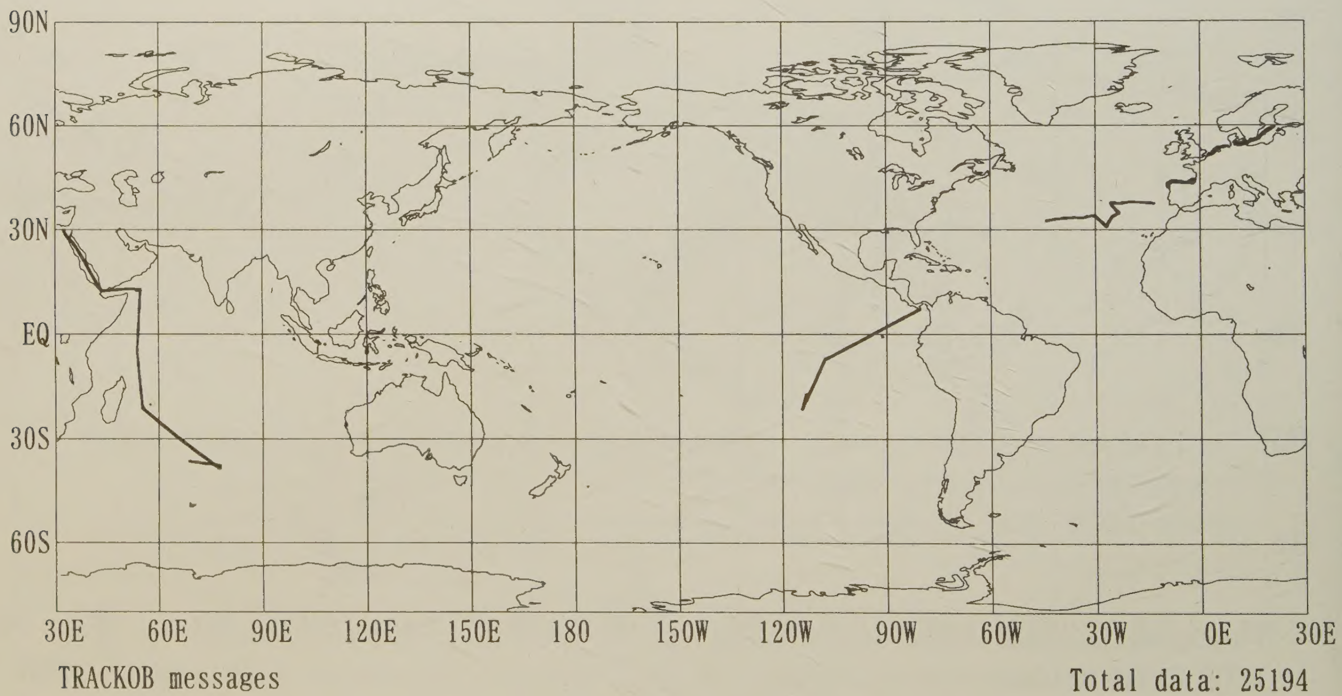




第32-1図　測点分布図(2004年 4月)

Fig. 32-1 Geographical distribution of SHIP messages (top) and BATHY/TESAC messages (bottom) for April 2004.





第32-2図　測点分布図(2004年 4月)

Fig. 32-2　Geographical distribution of BUOY messages (top) and TRACKOB messages (bottom) for April 2004.

気 象 庁 海 洋 月 報

Monthly Ocean Report

April 2004 (No. 136)

本月報掲載の 2004 年 4 月のプロダクトには、気象庁が観測したデータ及び GTS（全球気象通信網）を通じて入手した国際気象通報式による通報のほか、下記の機関等から提供いただいたデータを使用しています。御礼申し上げます。

防衛庁、水産庁、海上保安庁

水産総合研究センター

海洋科学技術センター

北海道大学

水産試験場等（北海道、岩手県、宮城県、山形県、茨城県、新潟県、富山県、石川県、福井県、愛知県、三重県、兵庫県、和歌山県、鳥取県、島根県、山口県、高知県、佐賀県、熊本県、宮崎県、沖縄県）

（順不同）

平成１６年５月２０日発行

編集兼発行者　気　象　庁
東京都千代田区大手町１－３－４

印刷所　有限会社　進英プリント
東京都渋谷区代々木 1-38-19